JULY, 1938

ELECTRICAL SOUTH

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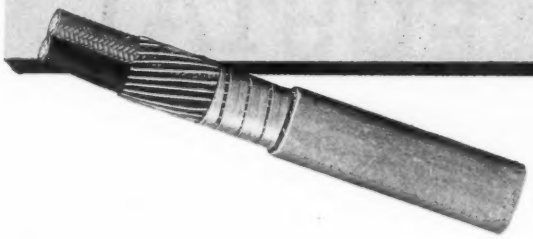
HAZARD

SERVICE ENTRANCE AND DROP CABLES

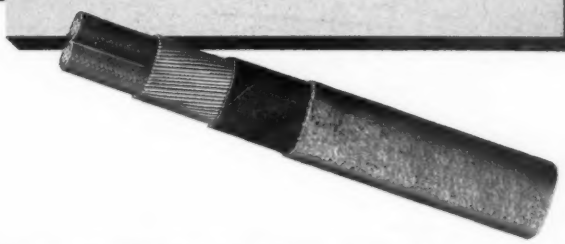
SERVICE ENTRANCE CABLE STYLE ABN

costs little, as it may be strapped to house without conduit. May be used with outdoor meter, or through foundation to entrance switch. Concentrically wound uninsulated neutral conductor and closely wound steel tape discourage current diversion.



SERVICE ENTRANCE CABLE STYLE UBN

differs from Style ABN, in that the steel tape is replaced by a heavier double-wrapped tape cushion, and that the concentric conductor has more wires giving a closer coverage to make it diversion-proof.



CONCENTRIC DROP CABLE TYPE SD

from pole to entrance cable on house. With single-hole entrance cap and rigid conduit, it is used from pole to meter. The closely wound concentric conductor makes it diversion-proof. Outer braid is finished with battleship grey paint.

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The FUSTAT

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JULY, 1938

Volume 18 No. 7

ELECTRICAL SOUTH

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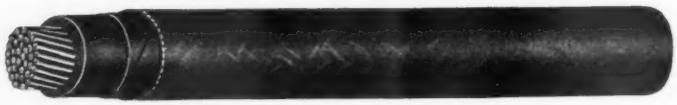

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Customer Survey

Takes guesswork out of sales promotion plans

By Edgar B. Chesnutt
Arkansas Power and Light Company

Arkansas Power and Light Co. has just completed a comprehensive appliance survey among its 52,788 residential customers.

ENCOURAGING results for both dealers and the utility have been achieved through the new co-ordinated sales program of the Arkansas Power and Light Company, General Sales Manager P. C. Tucker reports.

Of special value to both groups has been the survey compiled by the power company at tremendous expense and trouble, and supplied gratis to all appliance dealers. This survey, embracing all residential and commercial customers of the power company, gives the name and address of each, together with the make, age and condition of all electrical appliances owned. (See ELECTRICAL SOUTH for April, 1938, page 42.)

"Attitudes of many dealers toward the utility have been radically changed, resulting in a better feeling toward our company, because of the new plan," Mr. Tucker says. "This changed attitude has developed from the spirit of co-operation our company has shown the dealers.

"From the viewoint of the dealers, it has resulted in many benefits. Some have added new salesmen, and virtually all of them are more aggressive in their selling."

Working day and night after starting the surveys, the power company was able to place copies of them in the dealers' hands within a short time after announcing its revolutionary sales program, thus enabling dealers to launch their selling well in advance of the summer season.

From data obtained in the surveys, it was possible to make up tables showing the percentage of saturation per customer for each appliance, enabling dealers to gauge their needs for sales as well as parts. The overall results of the survey of residential customers are given in the accompanying tabulation.

Saturation Revealed

Interesting—in some instances, astounding—facts were disclosed through the surveys. For example, the percentage of saturation of some appliances was much higher than expected, while for others it was far below general assumption. For the power company's 52,784 residential customers it was found that there were 50,399 radios. Although this number is 95 per cent of the number of customers, it does not indicate that the radio field is 95 per cent saturated because the survey revealed that many customers owned several radios. In one home eight radios were found; in many, five were found. Electric irons were second highest in percentage per customer; portable electric fans ranked third; and electric refrigerators, fourth.

Cooperative Advertising

Of unusual interest has been the manner in which dealers and newspapers have joined in the co-operative advertising program arranged by the utility as a part of the new plan. An extensive advertising campaign, arranged by A. G. Whidden, advertising manager of the company, is being used which stresses the economy, value and convenience of electrical service. All of these advertisements stress the theme, "Buy Appliances from your Local Dealer."

Newspapers and dealers have been supplied with proofs of these advertisements in advance, and tie-ins using advertisements of the dealer on the same page with that of the utility are being used frequently. In this way both electrical service and particular appliances are advertised to the fullest extent. Several special sections on electric refrigerators, special pages on attic ventilation, electric ranges, etc., have been used.

As pointed out by the utility

when announcing this new plan to dealers, the survey affords many benefits to the dealers. In the first place, it provides a prospect list superior to any available before. It is a select list, containing only names of electrical users. It furnishes information about these users that gives the salesman an opening he might not be able to obtain elsewhere. The survey becomes a select mailing list. And in connection with this, the power company is rendering an additional service in mailing advertising matter for dealers. The company has prepared addressing machine plates from the survey and will address any advertising matter dealers may desire to distribute, the only cost to the dealer being the postage.

Another feature of the survey that is proving very helpful is the plan now in effect which will keep the survey data up to date. Blank forms are supplied the dealers, prepared by the sales promotion division of the power company, on which monthly reports are made on sales. Itemized blank forms are also supplied for reports in detail on major appliance sales. These reports are filed with the power company and from them the surveys will be revised regularly to keep them up to date. Dealers are co-operating wholeheartedly in this phase of the plan.

Appliance Saturation in Territory Served By Arkansas Power & Light Co.

Appliances	Number In Use	Percentage Saturation*
Refrigerator	23,409	44.3
Range	1,871	3.5
Waterheater	344	0.7
Dishwasher	22	0.0
Disposal	60	0.1
Mixer	2,267	4.3
Kettle	47	0.1
Kitchen Light	13,514	25.6
Cooker or Roaster	527	1.0
Percolator-Coffee Maker	8,763	16.6
Toaster	11,204	21.2
Waffle Iron	11,036	20.9
Hot Plate	1,334	2.5
Portable Range	87	0.2
Washer	10,216	19.4
Ironer	257	0.5
Iron	44,098	83.5
Attic Fan	244	0.5
Furnace Fan	91	0.2
Window Fan	975	1.8
Portable Fan	36,678	69.5
Cooling Unit	65	0.1
Heater	365	0.7
Humidifier	12	0.0
Heating Pad	4,909	9.3
Sun Lamp	140	0.3
Heat Lamp	107	0.2
Radio	50,399	95.4
Clock	6,219	11.8
Sewing Motor	4,891	9.3
Cleaner	12,439	23.6
Pump	2,460	4.7
Floor Lamps I.E.S.	16,650	31.6
Table Lamps I.E.S.	4,154	7.9
Pin-It-Up	5,141	9.7
Other Lamps	68,012	129.0

*Number in use divided by total number of customers but does not take into consideration customers operating more than one appliance of same classification.

Preparation of the survey entailed thousands of man-hours of work, as well as tremendous expense. The data was obtained by house to house canvass by power company employees, who followed meter routes. Two forms of canvasses were made, one for commercial and the other residential customers. Exactly 52,788 residential customers were interviewed.

When the canvassers turned in their cards to the sales promotion division, a battery of typists transferred the information to master stencils, which went to duplicating machines and scores of copies of each report were made. These copies, sheet by sheet, were assorted, bound in neat books, lettered on the outside, then mailed to dealers. Each dealer was supplied with a copy for each town he requested. These requests were made on blank forms supplied by the power company.

During the preparation of the

(*Continued on page* 18)

These men are in charge of Arkansas Power and Light Company's new co-ordinated sales promotion program. Left to right, P. C. Tucker, general sales manager; Max Sudduth, residential sales manager; J. F. Touhey, commercial sales manager; and Paul F. Denson, appointed to newly created position of dealer coordinator . . .

Merchandising

IN THIS SECTION:
Range Acceptance Enjoys Rapid Growth
Selling Water Systems
Salesmanship—Success or Failure

Electric Range Acceptance Enjoys Rapid Growth . .

SALES of electric ranges have quadrupled twice in the past five years—the fastest rate of increase in the electric appliance business—and present indications point to maintenance of this rapid pace of public acceptance, it was disclosed recently in a report submitted by Harry Mauger, chairman of the Electric Range Section, to a meeting of the National Electrical Manufacturers Association.

As recently as 1933, only one electric range was sold to every fifteen gas ranges but so rapidly did the public accept the modern features of electric cookery that this ratio was cut nearly in half the following year.

This trend has continued through 1935, '36 and '37, the report states. Electric range sales have increased approximately eight times, while gas range sales doubled, until at the present time one electric range is sold to every four gas ranges.

"This can only be interpreted in terms of public recognition of the greater desirability of the electric range," Mr. Mauger said. "Evidence of this is found in a recent survey of the cooking preferences and habits of housewives in all sections of the United States. Of the gas range users interviewed, 55 per cent said they felt electric cookery is superior in one or more fundamental ways to gas cookery. More than 33 per cent said their next range would be electric."

A wide differential exists, the report points out, between the actual cost of cooking by electricity and the idea which exists in the minds of many women. While many women believe that electric cookery costs as much as $10 per month, a survey of 1,384 homes in nineteen American cities disclosed that the average cost of electric cooking is actually only $2.30, and more than eighty per cent of the women interviewed said that their bill was less than $3.00 per month, the report states.

Preference for the electric range is also being shown in the present widespread kitchen modernization movement. In a recent Better Kitchen Contest conducted by *Better Homes and Gardens Magazine*, there were 30,000 entries. About one-half of these were for remodeled kitchens and one-third definitely for new kitchens.

Water Heating Council Award Goes To Florida Utility . .

Florida Power Corporation, St. Petersburg, was announced recently as winner of the cup offered by the National Electric Water Heating Council for the greatest contribution to the development of the domestic electric water heating load during 1937. With the cup goes a cash award of $1,000 to individuals in the company responsible for the accomplishment.

Of this cash award, $500 is awarded to R. H. Giedd, sales manager, and the remainder is to be divided among the retail sales directors and retail salesmen, according to the terms of the contest. Judges were E. N. Kobak, F. E. Watts and H. G. Dooley.

A. W. Higgins, president of Florida Power Corp., received cup from A. E. Julian, of the National Electric Water Heating Council, at the Sixth Annual Convention of the Edison Electric Institute, held at Atlantic City early in June, as shown at the right.

Roaster Market Expanding Survey Indicates . . . .

The market for household electric roasters is in a highly favorable condition, according to the results of a study made by Arthur Hirose, director of research, *McCall's Magazine*, for the electric roaster manufacturers, who are affiliated with the Domestic Appliance Section of the National Electrical Manufacturers Association.

This new study, presented to the manufacturers at their recent Hot Springs, Va., meeting, points out that electric roaster sales were five times as great last year as they were in the year 1934. Although only about four years old, the electric roaster ranked fifth in unit sales last year among the household electrical appliances selling at retail for more than $20.

Not only does the electric roaster make a strong sales appeal to distributors, electric light and power companies, department stores, hardware stores, furniture stores, radio dealers, specialty appliance dealers and other retailers, but it also presents a large number of

(*Continued on page* 18)

A suburban water system installed by the Tenn. Mill & Mine Co.

By R. P. McLeod

Selling Water Systems to the Rural Prospects

ALTHOUGH the extension of power lines into the rural sections brings the farmer many modern conveniences, most farmers point to "running water" from their electric water systems as the most essential service supplied. The Tennessee Mill & Mine Supply Company, Knoxville, Tennessee, has capitalized this fact to their advantage through their intensive promotion of the sale of water systems.

"When a new power line is run in a rural section, we consider every person living in that vicinity a prospect for a water system," said C. L. Nickle, president of the Tennessee Mill and Mine Supply Company. "We endeavor to get every prospect to visit our display floor where various types of systems are in actual operation for demonstration.

"Every visitor to our display is questioned tactfully as to his needs, and a survey of his farm is made without obligation by one of our salesmen in the field. The farmer is accustomed to making purchases from catalogs so we never fail to mail catalogs and literature to every prospect.

"Perhaps our unusual success in the promotion of water systems sales is due to some extent to the fact that we have been in business for thirty-two years and are well known to the rural people in this vicinity; however, I am convinced that a great part of our success results from our constant and intensive sales promotion work.

"The majority of our leads are obtained through satisfied customers who recommend the systems they have to their friends and neighbors. Also, the Tennessee Public Service Company has been most helpful in referring prospects on their lines to us.

"We have obtained many prospects as a result of one of our window displays which has proved most effective in stopping passers-by. It consists of a small pool filled by means of one of our pumps which also operates a miniature mill type water wheel. A number of small alligators are kept in the pool and attract much attention as they climb in and out. Residents of rural sections shopping in Knoxville are frequently attracted by this display and then step inside to learn more about the water system.

"One of our most spectacular installations," continues Mr. Nickle, "is a water supply system installed at the entrance to Westmoreland Heights, a suburban subdivision, which has supplied that subdivision with water for the past fourteen years. We explain with pride to our prospects that no repair work on this system has ever been required."

Mr. Nickle also mentioned that they obtained a considerable amount of business by keeping on the best of terms with all well drillers who are frequently in a position to persuade rural people to install pumps when the well is drilled.

The greatest percentage of sales closed, however, is the result of direct canvass by salesmen in the rural districts. J. W. Ellis, vice president of the company, who is in charge of this phase of the company's activities describes the results of their years of experience in pump selling:

"Before approaching a prospect, I learn all I can about him—his standard of living, his financial

A running water window display featuring several small alligators has proven an effective means of attracting attention . . . . .

status, and so on. First of all, I stress what it will mean for him and his family to have all of the water they want without having to carry it—my talk is modified of course to suit the type of prospect and his environment.

"After I have warmed up the prospective customer a bit," continues Mr. Ellis, "I begin to ask the questions necessary to make a complete survey of his needs. These include inquiries as to how much livestock he has, whether he keeps a car, intends to have a bath room, etc.

"Every prospect wants to get a water system at a minimum price. The most difficult problem is to sell a sufficiently large system to meet the needs of the customer. Unless a great many convincing arguments are given in favor of the larger pump, the rural resident will insist that he knows his water needs better than I do and that he can economize by getting the smaller system.

"The average farmer, at first, may not think in terms of gallons —however you can get him to visualize the amount of water he will need by showing him an accurate table which indicates just how many gallons each horse, hog, and chicken requires; how much to sprinkle the yard, wash the car; and how much the average housewife uses in the kitchen, what amount a family the size of his usually requires in the bath room, etc.

"You may have to talk in terms of barrels to some farmers. They will often put up an argument something like this: 'Now that small pump will give me three barrels of water a day and even one barrel is a heap of water.'

"I have to remind them that when you have to carry water you are economical with it but when all you have to do to get water is to open up the faucet, you will use it more liberally.

Requirement Table Helpful

"I always refer several times to my table in order to convince him that it contains authentic data as to the water requirements on the farm. One persuasive step is to have him ask some of my other patrons whose needs are similar to his as to the size of their pumps. I also emphasize that I have never had a customer say to me that I had sold him too large a pump but I have had scores to say 'I wish I had listened to you and got a larger system, mine's fine but just not quite big enough.'

Floor displays that include pumps actually connected for operation are especially effective in selling to the rural prospect . . . . .

Cost Figures Important

"Figures showing the small difference in cost between a large and small system may help him to decide on one of suitable size. Telling him that the larger system will enable him to have considerable fire protection may appeal to him as he realizes how disastrous a fire can be when there is no water to fight it. Other points to bring out in the sales talk are that as he adds bath fixtures, lawn sprinklers, etc., the amount of water needed in the future will be increased considerably.

"The survey of a farm is an important part of the salesman's problem. He must study the source of the water whether it is to be from a deep well, shallow well, spring, cistern, etc.; also as to amount of sand or grit in water to be pumped. If the latter condition exists, care must be taken that the suction line is not too close to the sand or serious damage to the pump will result."

In order to have satisfied customers, there are two requisites for every deal closed, Mr. Ellis believes:

A system of suitable size should be sold; and the pump must be installed properly.

Mr. Ellis finds that even his best effort and sales talk will not deter some customers from buying a pump too small for their needs because it is cheaper. In such cases, he can only remind them that they are buying a size of pump which he does not recommend.

Mechanical Operation Stressed

Most farmers are interested in studying the mechanical operation of the pumps. He leaves in the hands of all prospects diagrams showing in detail their construction and operation. The features to which he directs particular attention and which he emphasizes strongly in the models sold by his firm are:

1. Type of lubrication.
2. Type of drive.
3. Plunger speed.
4. Valve clearance.
5. Dependability.
6. Durability.
7. Ability to obtain replacement parts.

As a rule the man of the family is the one to interview regarding a water system. However in some cases where only the women seem interested in having running water in the homes, Mr. Ellis suggests subtly that the carrying of the water be turned over entirely to the man of the household. It is amazing how quickly the sales may then be closed.

SELL RUNNING WATER FIRST

ELECTRIC water systems help farmers to make money. They are also an important factor in raising the farm standard of living. That is why the electric water system is usually the first electrical improvement, with the exception of electric lights, that the farmer installs when electric service becomes available.

The electrical appliance dealer and contractor is certainly the logical vendor of the economical, package type electric water systems now being manufactured by a number of reputable firms.

Many dealers, recognizing this fact, have found it particularly advantageous to tie-in their own activities with those of the Electric Water Systems Council and their local light and power company.

The Electric Water Systems Council, sponsored by fifteen electrical water systems manufacturers in cooperation with the Edison Electric Institute, was formed five years ago to promote cooperatively the sale of electric water systems in rural communities throughout the United States. The Council adopted a slogan, "Running Water —Your Family Deserves It," and launched a nation-wide sales drive several years ago.

As a result of intensive promotional activity and general publicity, the sale of electric water systems has increased every year over preceding years. In 1937, 190,000 electric water systems were sold in comparison with 57,000 in 1933, the first year of the Council's cooperative promotion. The 1938 objective of the Council is the sale of 250,000 electric water systems.

Dealer Helps Available

For the dealer the Electric Water Systems Council has prepared a number of sales helps. One of these is an attractive two-color broadside suitable for mailing to prospects which is available at nominal cost. A new booklet, entitled "Running Water," is available without cost for personal distribution to potential prospects. This booklet urges the prospect to "get running water first."

Another particularly helpful promotional device is a sound-slide film entitled "Life in the Country." This film, stressing the advantages of running water, is an interesting and constructive presentation for group meetings of rural customers and prospects and for the training of the dealer's sales personnel.

Finally, the Council has prepared a new window card which features the slogan "Running Water—Your Family Deserves It."

To further develop interest in the sale of electric water systems, local light and power companies are urged to inform all employees, especially rural salesmen, of the 1938 plan of the Water Systems Council. They are urged to bring water systems dealers together in meetings and to organize local cooperative activity.

Utility Cooperation Urged

The light and power company is especially urged to prepare accurate prospect lists which can be compiled for advertising water systems to rural customers, both domestic and commercial, including those on new line extensions, new customers on old lines, and old customers not having running water. Prospects should be obtained chiefly through personal contact and through interest indicated by coupons from the new consumer broadside, and by returned cards from the new booklet, "Running Water," or by results from other advertising.

Many light and power companies are including electric water systems promotion in their sales plans, quotas, rural electrification meetings, exhibits and other activities in cooperation with distributors and dealers. Other light and power companies that are not now actively promoting the sale of electric water systems have indicated that they would include such promotions in their plans if sufficient interest was exhibited by local water systems dealers and distributors.

As part of their promotional plan, the individual pump manufacturers cooperating as sponsors of the Electric Water Systems Council are exercising particular care in the selection of dealers and are limiting dealerships to those who are adequately equipped to sell and service in their sales territories. These manufacturers are publishing and distributing to their dealers an educational sales bulletin which contains valuable information on the water system market, selling methods and plans, helpful data on pump selection and application, and much information suitable for use in local publicity.

The extensiveness of the market combined with the sales helps available should make it possible for electrical appliance dealers, especially those located in rural territory, to develop a profitable volume in the sale of electric water systems.

In spite of the many conveniences that running water brings to the farm, the electrical appliance dealer and his salesmen will find that an electric water system will result in dollar and cent savings on the farm that will more than pay for the system in a short time. Where the prospect cannot be sold on the strength of convenience alone, these savings may be emphasized advantageously.

Murray Wigsten, an up-to-the-minute farmer who makes an extensive use of electric service, presents convincing proof of these statements:

"Running water means more money to the farmer, more milk per cow, more eggs per hen, more apples per tree, more beef per steer, more strawberries and raspberries, more vegetables from the garden.

"Farmers spend their money freely," he says, "but they have cer-

(*Continued on page* 18)

SALESMANSHIP—SUCCESS OR FAILURE

THIS is the first of a series of articles based on a sales training course conducted recently by the Atlanta Electrical Association for the benefit of local appliance dealers and salesmen.

The fundamentals of salesmanship are discussed here by an authority on selling and advertising, well known throughout the South. H. L. Morrill, of Rawson-Morrill, Inc., has increased sales for many organizations through his presentations and can be made available to others.

Following articles in this series will emphasize the sale of specific electrical appliances.

STARTLING at it may sound, only ten people out of every ten thousand possess a pleasing personality—yet no other characteristic is so essential to the salesman, if he is to be an outstanding success.

On the other hand, about six thousand out of every ten thousand people have what is known as a neutral personality. They come into, and go out of, your life, leaving no impression, forgotten.

And then there is that third type—they number nearly four thousand in every ten thousand—who have a repellent personality. From the moment you meet them, look into their face, speak the first word, for some reason you dislike them.

There are far too many salesmen of the neutral and repellent type. And the sad phase of the problem is that a pleasing personality can be developed. One thing that will help you develop a pleasing personality is a "smile." As a salesman, one of the greatest assets you can have is a pleasant smile. Not a silly grin, but a sincere smile. With it, you can whip the biggest grouch in town.

Now, there are two types of salesmen: the type we call the successful salesman; and the other class we know as the failure. The astonishing thing, a fact that we cannot deny, is that there are far more of the failures and near-successes, than there are successful salesmen.

If this is true, let us investigate the reason for it. First, since there are more failures than successes, let's put down the word "F-A-I-L-U-R-E," each letter under the other. Now let's draw a vertical line, and then put the word "S-U-C-C-E-S-S" in the same way.

Be sure to put that vertical line down in your imagination, too; let that line represent a great, high wall. You cannot see both sides at once because there is a division. You cannot be a failure and a success at the same time.

Of course, there can be many reasons why a man will fail. He may lose his health, or there may be other reasons. Most of them, actually, are alibis and excuses. But we can take the word "Failure" and with the seven letters in that word we can find seven cardinal reasons why men fail.

The first letter is "F." It represents—"Fear." Failure is eternally allied with fear. Fear of what? Fear of yourself.

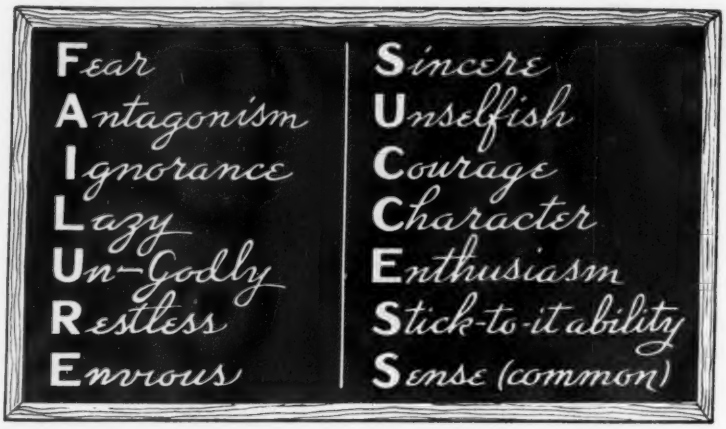
As a matter of fact, the failure doesn't know himself. And there are few people who do. They never go to the trouble to sit down with themselves, by themselves, and have a visit with themselves, and really get acquainted with themseves. If you have not done it, let me suggest you try it.

As an example, I should like very much to give you a personal experience I had. A number of years ago I had been connected with a certain organization, quite successfully; but in 1921 the readjustment period came. We call it a depression now. I was one among the thousands who were "readjusted" severely, and swept clean of everything over night. I had to start back out in the territory to recuperate my losses. I took the old kit bag and went back into the territory and worked a solid week without any results. I had never done such a thing before. I was astonished, surprised and grieved; but I did what I have suggested to you—I had a session with myself along this line.

I got in my room and I sat down and I said, "Look here, something's wrong with you! What is it?" Naturally the little alibi devils are plentiful; they are there to give us all the alibis necessary. And one of these little alibi devils jumped up and said, "I know what the trouble is; I know why you didn't get any business this week."

And I listened, and in my mind I said, "What was it?" And the little

"The greatest asset a salesman can have is a pleasant smile—not a silly grin but a sincere smile. It will beat the biggest grouch."



Mr. Morrill drew this diagram on the blackboard to emphasize the seven cardinal reasons why salesmen succeed or fail in their work . .

alibi devil said. "It's your territory. You have worked it all over, there are no more prospects; you've cleaned it up, there's nothing left."

"Well," I said, "Wait a minute," and in my mind I ran over that territory, and in a minute's time I was conscious of the fact that where I had seen one prospect there were hundreds or thousands I had never seen.

Then another one of the little alibi devils jumped up and said, "It's that concern you're working for. They just don't appreciate you. They're working you to death and they're getting the gravy while you're doing all the work, they're getting the money."

Well, I thought a minute, and I said, "You're just a little liar! If it wasn't for that concern, I wouldn't have a job to start with. That concern has spent hours of brain power, effort and money in building that business, and creating a job for me.

In effect they said, "Here it is, we've paid for it, financed it, and made this thing. You take it and go out and sell it. It's your job and your business." And they've paid me all I'm worth.

I listened to the little devils' alibis, all of them of the same calibre, and what did I do? The better man rose in me, and I said, "You big cry-baby, it's just you, that's all! You went back into that territory thinking about recuperating your losses, and in the back of your head all the time you were talking to that prospect, the one big thought you had was, 'If I sell him I'll make so much money, so many dollars!'

"Now do as you have always done, go back into that territory conscious of the fact that to all these people in that territory *you* are the concern you represent. They don't know anything else, and when they look at you they don't see you, except as you are the representative of our concern. They judge that concern by you. Watch your appearance, your manner, your conduct—You are the CONCERN to them! Think about giving your best service to your organization and to your prospect, forget yourself, and your dollars will take care of themselves."

I went back in the field, and my production picked right up. The whole idea is if we do our job right we haven't got time to think about ourselves; and let me impress upon you the fact that if you go at it with that one thought and idea, and give "your all" to the business of your concern and your prospect, you won't have to worry about yourself.

If our salesman is afraid of his job, if he doesn't know himself, he is powerless to get the most out of himself; if he doesn't know his job, and has only learned enough to hope to get by, his job is a meal ticket, that's all, and he is just kidding himself and his employer when he thinks he can succeed. He has got to get down to brass tacks and study and master his job and himself; otherwise, he cannot radiate confidence.

The next letter is "A," the first letter of another dominating characteristic of the failure, "Antagonism." We see that on all sides. We can go into many homes and find wives and husbands cultivating the habit of antagonism.

This failure is antagonistic with himself. in that he will not cooperate in his own mind with his God-given intelligence, the greatest power he has. The real power trys to dictate, and yet he won't listen. He knows it all!

The boss, the man above him, his associates, all are trying to pass along information to him, and help him, but he won't listen—antagonistic! And what does he do? Instead of cooperating whole-heartedly, he calls everyone a crook, and he goes about complaining, whispering.

I've seen one man of that type almost wreck a good organization. One disgruntled, dissatisfied salesman can do untold harm. And I say this to any man, in any organization: if he can't enter whole-heartedly into the interests of his concern, get out! Get out, and let some man get in there that can appreciate it and make the most of it.

Ask yourself the question, "Am I in any sense antagonistic toward my organization and associates?" Let your conscience answer the question. Then ask yourself, "Am I giving my best, am I giving my all?" If you are not, then something's wrong, and you know it.

Our next letter is "I"—Ignorance. Of course the failure is ignorant! There is no excuse for a salesman being ignorant in these days. Why is this man a failure? Simply because he chooses to be a failure. He is unwilling to pay the price of success. He chooses to be a failure; then when he gets up around 50 or 60, ragged in appearance, hungry, he blames the world for the whole thing.

When he gets in that condition, and goes about trying to weep on everybody's shoulder, telling his troubles, he soon finds out that the world isn't interested in him. But the world is intensely interested in the man who knows where he is going, and what he is going to do after he gets there, and that's the only kind of man the world is interested in.

Let's take the next letter, "L." Lazy! Too lazy to be any other way! Not too lazy physically, but in the head. Thinking is hard work, the hardest work in the world, and this fellow doesn't like hard work at all. He can get out and cover a lot of territory in a day's time; he can cover half the

COOL AS A DOG'S NOSE BOSS. IT'S THAT ONE-PIECE COPPER THAT DOES IT
YOU SAID IT JOE. NOTHING BUT WESTINGHOUSE FOR ME FROM NOW ON AND THEY'VE SURE LICKED BEADED CONTACTS WITH THOSE DIAMOND POINTED JAWS, TOO

SIMPLICITY IN SAFETY SWITCH DESIGN MEANS LESS HEATING

One-piece copper parts in Westinghouse Safety Switches assure cool operation at all times — there can be no heating from loose connections.

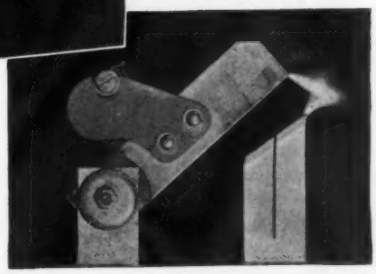
And years of trouble-free service are assured by these added Westinghouse features: Diamond pointed jaws and extended blades confine beading to points outside the contact areas . . . the "De-ion" feature on all Westinghouse 575 and 600-volt switches quenches destructive arcs almost instantly.

. . .

All commercial types and ratings. Call your local:

Electrical Wholesaler
Motor Dealer
Industrial Agent
Electrical Contractor

The exclusive Westinghouse diamond pointed jaw confines the bead to sections outside the contact area, sections which do not normally carry current.



WESTINGHOUSE ELECTRIC & MANUFACTURING CO., EAST PITTSBURGH, PA.

J-20518

Westinghouse Safety Switches

MOTORS • CONTROL • CIRCUIT BREAKERS • SAFETY SWITCHES • PUSH BUTTONS

city because it's so much easier to use his feet than it is to use his head.

Lazy mentally; too lazy to plan; too lazy to study; too lazy to prepare himself; says he hasn't the time. Whenever any salesman, any executive, or anyone else in a responsible job, tells me he is so busy that he hasn't the time to devote at least 30 minutes out of twenty-four hours to the study of his business, then that man is admitting to me that the job is running him. He's not running the job. He is mentally lazy.

The next letter is "U." Un-Godly. Of course the failure is an un-Godly man! And what do we mean by that? We mean he was born into this world a human being, made in the image of Almighty God, Who gave him a brain and the power to use it. But what has he done with it? He has permitted it to lie dormant, he is not capitalizing on it. Isn't this un-Godly? Certainly a man who will not make use of his own mind, cultivate it, use it, and capitalize on it as he should, is an un-Godly human being.

Restlessness Follows

The next letter is "R." Restless. The failure is restless, miserable, unhappy. Why? Because he is un-Godly, lazy, ignorant, and full of fear. How could he be calm? It's enough to make anyone restless when he realizes that. But in addition he is restless because he realizes he is a failure, hasn't what it takes to go back and rub it all out and start all over again. He hasn't got that, so he goes on through life miserable, unhappy and restless. Instead of devoting his time and efforts to studying and improving himself, he spends every minute looking for another job, because he knows he can't hold the one he has for very long.

The last letter is "E." Envious The failure is envious. Jealous, cantankerous, and disagreeable! Instead of trying to cooperate with everyone around him, he's jealous of those who are striving to do right. Criticizing, back-biting, and constantly finding fault! Jealous and full of envy!

There is your word picture of a failure! Perhaps you recognize him. I've seen plenty of them, and the country is full of them, all around us. The thing you and I have to worry about is not the other fellow, but the fact that we, everyone of us, have all these qualities within us.

In the word "S-U-C-C-E-S-S" we find seven letters, just as in the word "F-A-I-L-U-R-E." Likewise, we find seven first letters of seven qualities of a successful salesman.

Successful Traits

The first is "S." Study the successful salesman. What do you find? He is "sincere." Why is he sincere? He is sincere, first of all, because he realizes he is a man, that it is a glorious privilege to be a man, to fill a man's job, and to shoulder a man's responsibilities and duties. This successful man appreciates that fact so much that he is perfectly willing to put in his time in study and preparation for his job; in order that he may know and know that he knows all that he can possibly learn about that that job.

He is sincere in that he appreciates it so much he wants to give his best efforts, work and time, and everything else, to make that job a success. When he talks to a prospect, he puts that prospect in his own shoes and treats him in the same manner he would like to be treated if their positions were reversed.

He shows consideration for his prospect and for his concern, and every word he says, and everything he does, comes from the heart, sincere and honest. Study and watch, here, there and everywhere, and you will find that the quality of sincerity dominates the successful man.

The next letter, "U." Study the successful men and women, and you will find them "unselfish." Forgetting themselves, putting their all into the thing they are doing, the job at hand, whatever it is, giving, giving, giving.

Giving and Getting

We have heard a great deal of preaching about the go-getter. I agree with Vance Young, in that I am more interested in the "go-giver."

A fellow goes out to "give" service, instead of going out to "get." My experience has been that the world hands back two-fold what we give out, and if we are self-centered, contentious and insincere, it will all come back to us multiplied, believe me.

The next letter, "C." Another quality you will find in the successful man is "courage." He has the courage to do his own thinking. He doesn't let anybody do his thinking for him. He assumes his responsibility, has the courage to shoulder the load.

He is sincere enough to master himself, and therefore has the courage to step out and be a leader, unafraid. When opportunity comes, he grasps it and makes the most of it. Never has there been a bigger falsehood uttered than the one you have heard to the effect that "Opportunity knocks but once at every man's door."

Opportunity knocks many times, every day, at your door, and my door! The thing we have to be concerned about is to have our eyes and ears open and be prepared, equipped and ready to grasp and make the most of that opportunity when it presents itself. Napoleon said, "I make opportunity." And the keen, live, up-and-doing man does make opportunity.

"C" stands for character. The foundation of the whole thing is character! Because a man without character is just as helpless as a ship without a rudder at sea in the middle of a storm. Absolutely helpless!

Whatsoever you do, above all things, build character. It is the most priceless jewel you can possess. Without it, you cannot make the grade, and I am here to tell you that business today is crying for young men of real character.

You can say what you please about conditions in this country, opportunity gone, and all that kind of thing, but there never has been a time in the history of this country that provided as great an opportunity for men of real character.

The way is wide open if you have the courage, the backbone, to make the fight. But it is not easy. I am not going to tell you that this "Success" road is a bed of roses, because it is not! No man can travel it without encountering bitterness and disappointments, and trials and tribulations. He is going down in defeat once or twice, or a dozen times.

Abraham Lincoln ran for office nine times and was defeated each time, and then lost all his worldly possessions, and still had the courage to try again, and be elected President of the United States.

(*Continued on page* 40)

Contracting

IN THIS SECTION:
Wiring Exhibit Displayed in Mississippi
The Florist is a Prospect
Fort Worth's Largest Installation

Wiring Promotion Plans Develop Rapidly . . .

THROUGHOUT the South the Adequate Wiring Program gathers impetus almost daily. In Richmond, local electrical interests, working in cooperation with the Electrical League, have developed a comprehensive campaign of adequate wiring promotion.

The Richmond plan, supported by all branches of the industry including the Virginia Electric and Power Company, is centered around a series of 12 newspaper advertisements signed by a group of contractors, distributors and the utilities.

The Monongahela West Penn Public Service Company, Fairmont, W. Va., is planning an extensive tie-in with the National Adequate Wiring Program, according to J. R. Waters, Jr., residential promotion manager.

More than 6,000 persons visited a housing exhibit conducted in Fairmont recently at which the Monongahela company exhibited a wide range of modern wiring devices.

Permission to operate the Certification Plan has been granted to the Electrical Association of Birmingham by the National Bureau.

Certification Plans Announced

Charlotte, N. C., has also been added to the list of those cities licensed by the National Bureau to operate the Certification feature of the wiring program in its territory. The Certification plan will be under the direction of the Charlotte Adequate Wiring Bureau which includes three representatives from the Charlotte Electrical Contractors Association, two representing the wholesalers, and two representing the local utility.

Memphis, Tenn., also has been licensed by the national Bureau to operate the certification plan.

J. M. Mathews, secretary-treasurer of the Electric League of Charleston, W. Va., reports that a local adequate wiring campaign is now being developed with the support of all branches of the industry.

The Charleston Adequate Wiring Committee includes Henry Hopkins, Appalachian Electric Power Company, chairman; Raymond Schoolfield, electrical contractor-dealer, and George Starkweather, jobber. Sam Olver, of the Virginia Electric Company, is president of the League and is heartily in support of the local activity.

More than 200 representatives of Louisville, Ky., electrical interests attended a meeting recently to hear a presentation by O. C. Small, secretary of the National Bureau.

A similar meeting was held in Norfolk, Va., with an attendance of more than 70 representatives of local electrical interests. L. W. Davis, general manager of the N.E.C.A., and a member of the Plan Committee, addressed the group. A second meeting was held shortly afterwards at which plans for a local program were discussed.

Field Work Continues

Activity is also continuing in the Southwest where A. E. Schanuel, field representative of the Bureau, visited 15 cities during the month of June. Among the cities in which meetings were conducted were San Antonio, Austin, Corpus Christi, Houston, Beaumont, Dallas and Fort Worth, Texas; Tulsa and Oklahoma City, Okla.

A. C. Tait, another Bureau field representative, also addressed a series of meetings in the South during the month of June. Among the southern cities on his itinerary were Owensboro, Ky., Huntington, W., Va., Charleston, W. Va., Fairmont, W. Va., and Alexandria, Va.

Committee Reports On Motor Terminal Boxes .

A JOINT committee of representatives of National Electrical Manufacturers Association, National Electrical Contractors Association, National Machine Tool Builders Association and International Association of Electrical Inspectors, appointed for the purpose of making a study of motor terminal enclosures with a view to making recommendations with regard to wiring space and with regard to dimensions and knockouts, submitted these recommendations:

(a) That the position of hole for motor leads should be as far as possible from the conduit opening.

(b) That terminal boxes be designed so that when the cover is removed, there will be a maximum of accessibility for the making and taping of connections.

(c) That boxes be arranged or mounted so conduit can be properly accommodated from both of the vertical and horizontal positions.

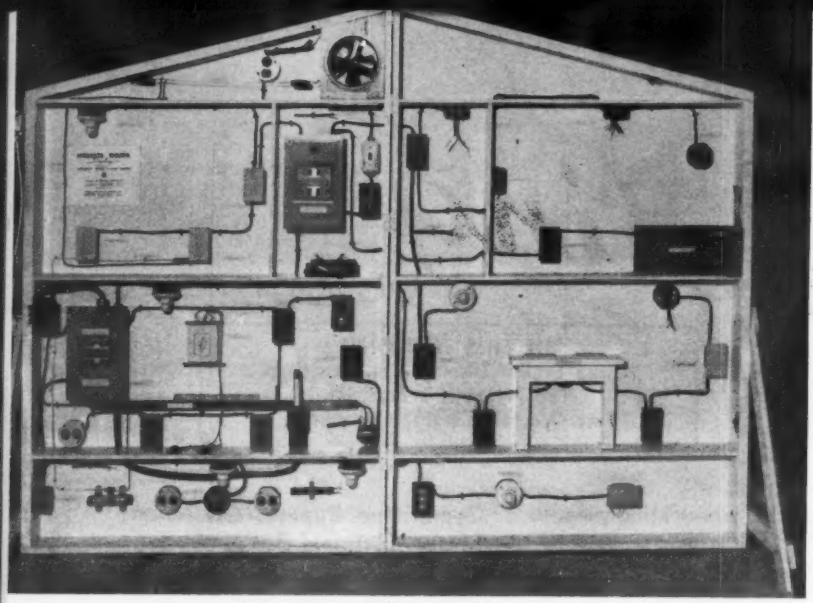
(d) That motor leads be arranged to minimize crossing when connections are made.

(e) That motor leads be made of extra flexible cable and not provided with companion lugs.

(f) That holes for conduit entrance in pressed steel boxes be arranged for minimum conduit size and that holes for conduit entrance in cast metal boxes be drilled and tapped for the maximum conduit size.

(g) The Committee further recommended that the NEMA members of the Committee give careful consideration to the design of a motor terminal board which can be mounted in a box of minimum size and will result in an assembly giving the maximum of ease in making connections which can be preferably left without taping.

(Continued on page 42)



THIS adequate wiring display has been utilized advantageously in Mississippi to demonstrate to home owners and prospective builders the economy and convenience of adequate wiring. It serves to dramatize a wide range of devices.

Adequate Wiring Exhibit Displayed Throughout Mississippi

By R. S. McFarlane

Sales Promotion Department
Mississippi Power & Light Co.

WITH factories moving southward in great numbers and with the Federal Housing Administration active in aiding the salaried man to become a homeowner it is time to call attention to the great need for adequate wiring in both the home and factory.

The State of Mississippi has just secured a ruling in a test suit allowing incorporated towns the legal right to issue bonds for financing factory buildings as an inducement to new industries to locate within the state. This will naturally increase the demand for new homes and with all other factors favoring the program, Mississippi is in the midst of a new home building spree.

Adequate wiring is one phase of home service that has never before been dramatized for its full value to the homeowner or tenant.

A very novel plan has been evolved in Mississippi to direct the attention of Mr. and Mrs. Homemaker to the advantages of adequate wiring and create in a dramatic way the desire for the wiring conveniences and economies it provides.

The adequate wiring display illustrated here is being shown in 19 different towns in Mississippi for a total of 48 days in connection with the 1938 state-wide cooking school known this year as the "Happy Homer Review." This cooking school is an annual program promoted by the Mississippi Power & Light Company in the interest of electric and gas appliance sales and sponsored by the leading newspapers and appliance dealers over the state.

Particular attention is being directed this year to the need for adequate wiring and homemakers are specially invited to make a close inspection of the display which comprises a cross-sectional view of a home showing attic, second floor, first floor, and basement.

The display has been designed to dramatize:

1. The use of circuit breakers to replace fused switches and distribution panels and to emphasize the need of load centers with radial wiring systems.

2. The new simplified wiring plans using covered neutral cable to effect advantageous savings in wiring costs; and to demonstrate the simplicity of its installation.

3. The need of specifying in contracts that safe, dependable and adequate amperage switches be used.

4. The convenience and simplicity of 3-way and 4-way switches.

5. The convenience and economy of pilot light switches to act as a "tell-tale" when you have forgotten to cut off the basement or closet light.

6. The availability of different kinds of devices with various color schemes in switch plates and convenience outlet plates.

7. The convenience and economy of using the electric range convenience outlet receptacle especially in apartments and homes built to rent or wherever ranges are to be installed.

8. The convenience of the "plug-in-strip" especially in the average kitchen where numerous appliances crowd the duplex receptacles, and for use in base boards of the more expensively wired homes

9. The installation of an attic fan and its convenience when installed with a time switch

10. How the bi-metal strip of the circuit breaker works and how simple it is to reset after a protective operation.

The display is so efficiently de-

(*Continued on page* 42)

Fort Worth's Largest Electrical Installation

Outstanding because of adequacy as well as size

ELECTRICAL work on the new wing of the Montgomery, Ward & Company building in Fort Worth, Texas, was such as to make this one of the outstanding jobs of its kind in the South in many months. The work was done by Shotts Electric Company, Fort Worth, under the supervision of Gus S. Landman, part owner of the business.

The building extension consisted of basement and eight floors. The building is used for the mail order plant, with general offices for the southwest district on the eighth floor.

The design for the electrical installation was prepared by Montgomery-Ward electrical engineers in Chicago, with the assistance of Fort Worth plant engineer, J. M. Parker, and the Shotts Electric Company.

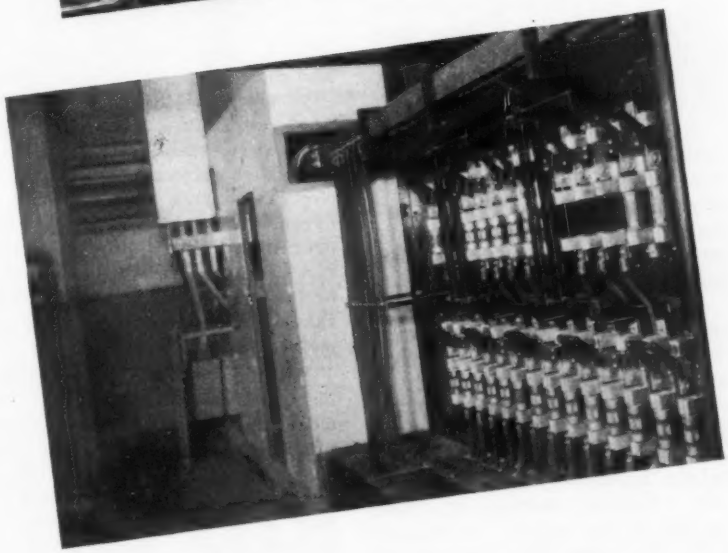
One of the most difficult phases of the entire installation, according to Mr. Landman, was the relocating of the main switchboard without in any way interrupting service.

Safety Switchboard Installed

The old switchboard was about 26 feet long, standing in east-and-west position. It was moved several feet and changed to north-and-south position, and a new board, almost equal in size to the old one, was added.

The new switchboard is of the dead-front, live-back type, consisting of twelve 400-amp. fuse switches. The entire switchboard is now housed in a separate room with fireproof doors containing no other equipment in it.

Formerly rubber-covered feeders were used. These were replaced with a busway installation. A duct more than 100 feet long was run from the transformer vault to the switchboard for the bus bars. The service consists of two ¼-inch x 4-inch bars for neutral, and three ¼-inch x 4-inch bars for each phase of the four-wire, three-phase system; or a total of eleven bus bars housed in metal enclosure.



Two of the unusual features in the wiring and lighting of an eight-story addition to Montgomery, Ward & Co's Fort Worth, Texas, branch were the use of exposed conduit throughout suspended on hangers inserted when concrete was poured, and the use of a busway installation of more than 100 ft. in length for the main service.

The three transformers were each increased from 150 kva to 200 kva, giving an increase of 150 kva in capacity. The service can be operated from outside the vault, eliminating the hazard of going into it. Meters are also outside.

In redesigning the transformer vault for the new installation, the power company installed a dual set of four-wire, three-phase primary feeders, which are interlocked so that failure on one feeder permits operation on the other without loss of service.

(*Continued on page* 20)

Arkansas Utility Makes Customer Survey . . .

(*Continued from page* 6)

survey, Alfred Givens, Jr., director of the sales promotion division, directed the many phases of the work. No expense or time was spared in ascertaining that each page of the survey contained exactly the information that had been given the canvasser. All expense in connection with the survey and its distribution has been born by the power company.

What will be the reaction of the dealers to this plan? That was the question General Sales Manager Tucker and his two assistants, Max Sudduth, residential sales manager, and J. F. Touhey, commercial sales manager, gave much thought to during the preparation of the new program. It was felt that the dealers—at least some of them—would receive it with some favor. But little did they think that the program would meet with the overwhelming enthusiasm that has been shown to date. Hardly had dealers received copies of the survey before letters began to pour into the sales office.

Many dealers who had shown nothing but antipathy toward the power company's sales department, immediately reversed their attitudes, and launched out into aggressive cooperative sales campaigns with splendid results.

From one of the largest appliance dealers in the state came a voluntary letter, stating that "this is the most outstanding thing ever done for the electric appliance dealers in the state. I think that you are going way out ahead of the whole industry and deserve the whole-hearted support of every dealer in the state."

In the same mail was another letter from a dealer who asserted: "Frankly, we never dreamed of having such worthwhile information. It is what we have always wanted but never dreamed of getting."

"We know of no contribution which your company could make in its endeavor to cooperate with dealers in this territory which would have been of more service," wrote a dealer operating a chain of stores.

"We were so impressed that we put on an additional outside salesman to follow through on this survey and we feel this is the best thing we have yet had to help us sell merchandise," another firm reported.

"To be frank, I was skeptical about how it would work, but now I wish to say that it is helping me in my sales tremendously and my salesmen find it a virtual grab-bag of prospects," asserted another.

From one of the largest firms in the state came a letter stating that "it is our firm belief that the information you are now furnishing us is invaluable to the appliance dealers."

These extracts are but a few from scores of letters that are continuing to flow into Sales Manager Tucker's office.

"It is doing everything we hoped for, and more too," is Mr. Tucker's description of the results of the survey.

Roaster Market Expanding Survey Indicates . . . .

(*Continued from page* 7)

talking points for Mrs. Consumer. The roaster has the appeals of novelty, newness, usefulness, cleanliness, economy, coolness, convenience and portability.

Because they require no special electrical wiring and no special inducement electric rates for their operation, the new roasters are going into homes to supplement rather than replace all types of kitchen ranges of the coal, kerosene, gas and electric variety.

The fact that millions of women have become familiar with the older electrically operated food-appliances like the refrigerator, the coffee maker, the mixer, the toaster and the waffle iron indicates the ease with which housewives can be sold electric roasters for new satisfaction in the preparation of appetizing meals.

Sell Running Water First To Rural Prospects . .

(*Continued from page* 10)

tain very definite ideas as to how they will spend it. They simply will not hitch the cart before the horse. In their minds an additional bridge lamp or an electric range before they have water under pressure puts the cart decidedly before the horse. This is right thinking.

"On my farm, which is not large, we keep 20 cows and 400 to 500 hens. We grow crops to feed them and some to sell. With our modern equipment, one man does all the work.

"But suppose we take away the water system—what then? It would take five hours, every day including Sundays—35 hours a week—just to pump and carry the water. That is a whole week's work to some minds. But suppose it is only half a week's work. These farm men cost, with privileges, about twenty dollars a week. That would be ten dollars a week to pump and carry water! Forty dollars a month! Forty dollars a month would buy the complete electrical equipment for any farm!

"That isn't all. My cows give 15 per cent more milk because they have water in the barn, and the hens lay more eggs with water always before them. I don't know so much about hogs and beef, but common sense tells me plenty of water will help them also.

"As a farmer I would like to suggest that more than water comes into a farmer's system when he takes that first cool drink from his new electric water system. He gets an inspiration to modernize and electrify that no other appliance he ever buys will bring him. It pays him big profits, and it makes the next step look easy to him," Mr. Wigsten concludes.

Southern States Participate In New Building Projects .

Presidential approval has been granted 58 Public Works Administration school allotments totaling $3,119,902. These approved projests have a total estimated cost of $6,543,125 and represent a resumption of the present PWA program. The total estimated cost of projects located in the southern states amounts to $2,803,158.

Funds earmarked for slum-clearance and low-rent housing in the government's $500,000,000 program have reached a total of $357,-874,000 for 95 communities in 23 states and the Territory of Hawaii.

Forty-three of the communities are located in southern states and the total amount approved for these communities is $108,808,000.

Earmarking of funds for local housing authorities is the initial step taken in negotiations for loans from the U. S. Housing Authority.

The Florist is a Prospect

By Baron Creager

THE experience of this Tulsa florist indicates that electrical equipment will produce savings many times greater than the investment.

Only a small investment is required in equipment to produce the advantageous results described by this florist. His equipment includes sixteen 150-watt lamps mounted in 12-inch reflectors, and about sixty feet of underground, lead-covered soil-heating cable. The electrical energy required for controlling plant life at the Clark shop costs only eight to ten dollars each month . . . . . .

IF THE experience of J. G. Clark, Tulsa florist, is a criterion, there is a potential market among florists in the South that the electric utilities and contractors can well afford to investigate.

Mr. Clark recently made an analysis of his business for the past year and found that the electricity he used for stimulation of plant life saved him at least a thousand dollars. On the other hand, the same electric stimulation enabled him to control certain plant life with such accuracy that he had desirable plants out of season —at times when the plants were not elsewhere available in Tulsa— with the result that they commanded a premium as much as 50 per cent above the market price.

It might be assumed that to accomplish this, Mr. Clark has an extensive investment in equipment, but that is not the case.

His special equipment consists of 16 ordinary 150-watt bulbs, mounted in 12-inch reflectors and suspended at varying heights above the plants to be stimulated. Then there is 60 feet of underground heating cable, which cost $14.50 installed. Finally, the extra current necessary for controlling plant life at the Clark shop costs from $8 to $10 a month.

The Clark Flower Shop specializes in potted plants, so there is no experience here on what the southern florist can do by stimulation of the more sensitive roses.

But on potted plants, Mr. Clark is a pioneer, at least in Oklahoma. He became interested in the subject two years ago and read all the printed information available, including bulletins from universities such as Ohio State and Illinois, where extensive experiments were conducted. He also had advice from one of the larger electrical manufacturers based on the experience and research work of that company.

But when he began experimenting, he found that his limited "book education" on the subject had served only to teach him fundamentals. Experiments in electric stimulation of plant life, on which the records are available on a scientific basis, have been conducted almost exclusively in northern regions. In actual practice in the climate of Oklahoma, electric stimulation did not produce the same reaction from the same plant that might have been obtained in northern cities.

He concluded that results are easier to obtain in the North because of more settled seasonable temperatures. He varied the amount of light, or heat, and the distance from the plants to be stimulated in a number of cases. His experiments in the first year cost him possibly a hundred dollars in plant losses, but he got it back with interest in 1937.

What is important to the electrical industry in the South, he points out, is the fact that artificial stimulation has more utility in the South than in the North. As previously mentioned, northern climates are more settled by seasons. But in many sections of the South, especially in Oklahoma, temperatures fluctuate rapidly. Since plants

thrive best in even temperatures, the value of temperature controlled by electricity is obvious.

The principal units in Mr. Clark's system of electric stimulation are his "forcing" house and his propogation bed. The "forcing" house is glassed in, equipped with manually-operated ventilators and contains the 16 reflector-mounted, 150-watt bulbs with which the overall temperature can be raised 5 degrees. Its size is 12 feet by 33 feet.

Large Savings Realized

The greatest single saving realized so far from the "forcing" house was in the case of a shipment of $700 worth of Easter lily bulbs which had been retarded in development. Normal greenhouse methods would have brought these lilies to maturity too late for Easter sales. But the lily bulbs went into the propogation bed, had "forcing" house treatment at the proper stage, picked up the two weeks lost and were prime for the Easter market. Without electricity, there would have been a $700 loss. And the cost was approximately the cost of electric current for four hours each night over a period of three weeks.

Early this year Mr. Clark had a supply of Calceolaria which brought him from 50 to 75 cents more per plant than the market price because electric stimulation had brought them to maturity six weeks ahead of the market.

Yet there are some plants—poinsettias and chrysanthemums, for example—that are retarded by electric stimulation at night. They are "long day, short night" plants and to keep them "awake" with electric light simply exhausts them.

The Clark propogating box measures 3 feet by 15 feet and in it, under 4 inches of sand, is buried the 60 feet of heating cable. It is equipped with thermostat control to insure even temperature. In the propogation of cuttings it serves to reduce losses to a minimum. For example, in a recent lot of 3,000 ivy cuttings, the loss was less than 1 per cent, compared with a previous average loss of from 12 to 15 per cent. Ivy cuttings are really insignificant at 1 cent each, but a 15 per cent loss on all classes of cuttings over a year is not insignificant, Mr. Clark points out. And in the propogation box, he can reduce by one week the time required to bring cuttings to the point of planting.

There are many other available illustrations of the manner in which Mr. Clark turns electric current into profit for his flower shop. He beats the primrose market, for example, and gets $1.50 against the later market price of $1.00. And he is just learning. Experiments are going on all the time —how to space lights, how long to let them burn for this or that plant, what plants retard or accelerate, how much more light they need on cloudy days—all the thousand and one angles for which his principal guide is 16 years of experience in the business.

But he believes that an experienced florist will not make many mistakes, even if he starts without experience in the use of electrical methods.

Mr. Clark's next investment in electrical equipment will be in a sterilizing box, an apparatus that purifies a cubic yard of dirt by the application of extreme heat.

He is otherwise sold on the use of electricity in the florist's business. His principal "house" is his showroom, 30 feet by 100 feet, in which he displays an extensive array of mature plants ready for the market.

This showroom, fronting on a heavily-traveled boulevard, is open until 10 o'clock each night and is flooded with the light from bulbs with a total of 5,000 watts of capacity. This vivid night display more than pays for its cost in advertising alone, he declares.

Fort Worth's Outstanding Electrical Job . . . . .

(*Continued from page* 17)

Lighting in the new section of the building consists of one master outlet per bay on 20-foot centers, with a circuit of either No. 12 or No. 10 wire, depending on length to each outlet. Before finishing the job, the Shotts company made extensions from most of these master outlets to individual lights throughout the building.

The Montgomery-Ward job has an unusually large capacity for this type of building, inasmuch as 5,000 feet of 500,000 cm cable was used.

The entire wiring for lighting was installed in conduit ranging from 1¼-inch down to ½-inch in size and was all exposed, with no elbows, by making all turns in pull boxes. The installation of the exposed conduits was expedited by installing inserts in the concrete for the support of all boxes and conduit instead of drilling holes after it was poured.

Three-way switches were provided in the aisles in all stock rooms in the new building. This enables control of lighting from either end and means quite a saving in energy and employee's time.

Wiring in the old section of office on the eighth floor was reinstalled to match the new section. Lighting now is installed on 10-foot centers and consists of more than five hundred 200-watt suspended units of their own design, a special type which reflects a ring of light up against ceiling, in addition to direct light below.

In addition, ceiling fans were removed, and 130 circulating type fans installed. These fans blow air toward ceiling and are so spaced as to provide a general circulation of air throughout the entire office.

In the office there are 42 pillars and 16 pilasters. Conduit was run from center box to each pillar and each pilaster, for telephones and lights. Each one also has a duplex outlet for electrical connection. Telephone wires formerly were strung on ceiling.

A 250-hp boiler was added for heating. Whereas the two previous boilers were manually controlled, the three are now automatically controlled electrically. Electric automatic controls were installed for low-water cut-off and high pressure cut-off, and for cutting off oil supply to the burners.

Sprinkler system in the new building is automatically supervised, as in the old building. Signals are recorded at a supervisor's desk in the front lobby of the main building. By means of a tape a permanent record is made showing any water leak, which might be an open valve, an open sprinkler head or a leak in the system. The signal system also records water levels and air pressure in the sprinkler tanks on top of building.

A local fire alarm system was installed in the new building, with fire alarm box and gongs. These signals also come in to the supervisor's desk and are recorded. If trouble appears, a bell rings and directs attention to its location.

Engineering

IN THIS SECTION:
Gilbertville Dam—Largest TVA Project
Automatic Power Factor Regulation
Sheffield Completes Distribution System

Gilbertsville Dam To Be Largest TVA Project . .

THE longest reservoir in the world—184 miles, three times the length of Panama Canal—will be created on the Tennessee river by the proposed Gilbertsville Dam.

The farthest downstream dam in TVA's series of high dams for a unified program of flood control, navigation and power, Gilbertsville Dam will cost an estimated $112,000,000.

Gilbertsville Dam will be the largest of TVA projects. Here are some of the figures:

Location—22 miles upstream from Paducah, Ky.,

Length of dam—8600 feet,

Height of concrete spillway — 150 feet,

Width of spillway—1210 feet,

Lock—600 feet long and 110 feet wide, with maximum lift of 68 feet.

The spillway is designed to pass with safety 960,000 cubic feet of water a second. The maximum flood on record on the river, the flood on March 25, 1897, carried a flow of 450,000 cubic feet a second.

The powerhouse will have an ultimate installation of six generating units with a total capacity of 192,000 kilowatts. Only the intakes are to be built at the outset, and the powerhouse and generators are to be installed when required.

Entire villages will be submerged and at least 15,000 persons will be compelled to seek new homes when the dam backs up the waters of the Tennessee river.

Southern District A.I.E.E. Meeting Announced . . .

The Miami Biltmore Hotel has been selected as headquarters for the American Institute of Electrical Engineers' southern district meeting to be held November 28-30, 1938.

Under the leadership of Edwin D. Wood, vice president, southern district, a splendid program of technical papers and entertainment is being arranged.

Meeting committee chairmen participating in the plans are: W. Austin Smith, papers; J. C. Jones, program; J. B. Hiers, Jr., finance; J. D. Prestin, attendance and publicity; E. F. Johnson, hotels and reservations; P. J. Carlin, transportation; and R. Y. Pool, entertainment.

The meeting will be sponsored by the Florida Section, headed by A. P. Michaels, chairman, and Joseph Weil, secretary-treasurer.

Unique Substation Building Design . .

A NEW substation completed recently for the Middletown, Ohio, Gas and Electric Service Company is said to be one of the most modern in building and equipment. Two buildings of frameless steel chassis and porcelain enamel exterior house the ultra-modern equipment. The buildings are said to be among the first of their kind ever erected for a utilities company, although frameless steel buildings are increasingly common in other fields. Design of the building is unique. Advantages of this type of construction indicate that it will have widespread popularity among utility companies. The buildings have no frame, as the insulated steel panels composing walls and roof are load-bearing and self-supporting. Insulation is of fermiculite, except for the roof, which has rigid board insulation.

The 3,700 square feet of porcelain enamel was supplied by the Erie Enameling Company, Erie Pa., on a base of 16-gage Armco enameling iron—a "home town" product, as it is manufactured by The American Rolling Mill Company, of Middletown. Stainless steel clip strip holds the porcelain enam-

(*Continued on page* 24)

Unique substation building of frameless steel chassis and porcelain enamel exterior completed recently.

Automatic Power Factor Regulation In Distribution Feeders

By E. H. Stivender
Switchgear Division
Allis-Chalmers Mfg. Co.

FOR YEARS some public utilities have encouraged power consumers to provide power factor correction in their plants. The practice has become so important that an increasingly greater number of utilities serving industrial areas are offering attractive inducements for consumers to install corrective apparatus. This apparatus sometimes runs into appreciable expenditures by the consumer; and when he does make such investments, it is naturally with the expectation that he will be duly compensated within a few years.

In the past, power factor corrective equipment consisted of fixed quantities of static condensers or of synchronous equipment. There now seems to be considerable possibility of improving operating conditions at a considerably lower cost by using a combination of fixed and automatically controlled static condensers so as to automatically maintain good power factor.

By automatically controlling the power factor, it is possible to have nearly the same voltage at each end of a distribution feeder at all times; and in some cases, the more inductive reactance there is in a line, the better the voltage regulation will be. That is, whereas the ordinary feeder is built to bring the lines as closely together as possible in order to reduce reactance, the use of automatically controlled capacitance permits the lines being placed as far apart as possible, providing better insulation between lines and better voltage regulation. In addition, there is a worthwhile reduction in losses all the way back to the generating station. By placing reactors in the line it is possible to get even better voltage regulation.

The equipment for automatic power factor regulation consists of control apparatus arranged to insert or remove automatically parallel capacitance in the circuit, thereby maintaining a given value of power factor regardless of changes in the load conditions. Owing to the fact that fine step regulation of capacitors would probably be economically impractical for most installations, no suggestion is made that this equipment replace feeder type voltage regulators. The equipment would, in many cases, supplement voltage regulators and in others serve where voltage regulators are not feasible.

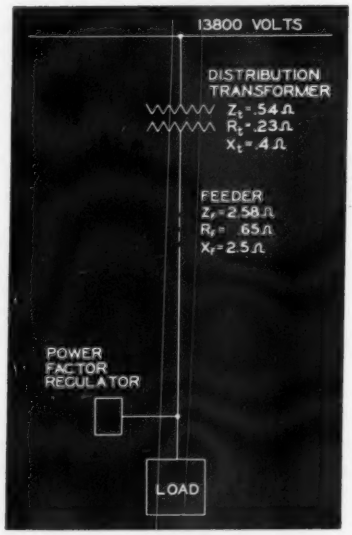


Fig. 1—A simple system consisting of a single, or three-phase transformer supplying a feeder to which a reasonably balanced load is connected . . . .

It is generally known that most of the voltage drop in distribution lines is due to lagging current flowing through inductive feeders. While the feeder voltage regulator maintains constant voltage regardless of the amount of wattless current flowing, the power factor regulator eliminates most or all of the wattless current, thereby improving the inherent voltage regulation of the feeder often as much as 500 per cent. If induction type voltage regulators are used the wattless component in a feeder may be considerably increased adding considerably more losses to the system. The power factor regulator, although admittedly not giving the same voltage regulation, reduces losses, and as will be shown, gives desirable voltage regulation on some of the usual types of feeders supplying inductive loads.

Capacitors could be added which would permit the power factor to become increasingly leading as the kw load increases in order to provide flat voltage regulation where such operation is desired; it is felt, however, that in practically all cases the voltage regulation resulting from maintenance of unity power factor would in itself be sufficient. Better regulation than this would naturally require additional capacity in the condensers and hence would increase the cost.

With the usual fixed capacity installations for power factor correction, the entire condenser unit is in service at all times, which results in considerable leading current flowing in the line during light loads. In many feeders, this leading current causes excessive rise in voltage at the distribution end of the line at light load periods shortening the life of apparatus affected by voltages higher than normal, such as incandescent lamps and radios. Automatic regulation of the capacity connected in the circuit prevents voltage rise above normal by controlling the value of leading power factor. Heavy leading currents also contribute energy losses in distribution equipment similar to those due to lagging currents.

It is to be understood that the regulating device under consideration is not a reactive kva regulator. It regulates for zero reactive kva

when set for unity power factor; but at all other settings it regulates for constant power factor allowing the reactive kva to vary directly with the kw. A reactive kva regulator would not provide the flexible service offered by the power factor regulator. The regulating element of this unit is similar to that of a contact-making voltage regulator element, solenoid operated, of rugged construction and high torque. It is not simply a contact-making power factor meter or a synchronous motor with a-c field excitation. The number of taps on the condensers determines the smoothness of regulation. More capacity can be added as conditions require.

The equipment is set up similar to the usual fixed condenser installations except that the frames are designed to allow the condensers and control in a compact unit.

The tap changing apparatus consists of oil-immersed contactors, magnetically operated for 2300 and 4000 volt units, and steel-enclosed, air-break contactors for lower voltage units. The equipment is designed especially for power factor regulators—compact and capable of standing hundreds of operations daily. On distribution feeders the requirements are generally for outdoor equipment, and provision for this can be made by housing the assembly in steel.

Protection against overvoltage may be provided by an overvoltage relay set to limit to a definite amount the capacity in the circuit. Protection against short circuits may be obtained by the use of individual fuses. A main circuit breaker with overload relays is also provided with each unit.

A control handwheel affords manual operation. Settings for different regulated power factors are made by adjusting a knob on the regulating element. Single-phase or three-phase regulation can be provided.

The following calculated data indicate the advantages of automatic power factor regulation for various applications:

Case 1. Fixed capacity with no regulating equipment. The sketch of Fig. 1 shows a simple system consisting of a single- or three-phase transformer supplying a feeder to which a reasonably balanced industrial load is connected. An automatic power factor regulator is connected near the load. The transformer is rated at about 400 kva, being of such size as to accommodate additional load in the future. The ratio is 13800/2300 volts.

Z_T=0.54 ohms
R_T=0.23 ohms
X_T=0.4 ohms (total primary and secondary impedance)

In the feeder,
Z_F=2.58 ohms
R_F=0.65 ohms
X_F=2.5 ohms.

The load is 2300 volt equipment rated at 242 kw, 75% power factor. Putting this in terms of impedance,

Z_L=16.4 ohms
R_L=12.5 ohms
X_L=10.85 ohms

Adding impedances Z_T, Z_F, and Z_L, the total impedance Z is

13.18+J13.75 ohms.

If 13,800 volts are on the primary side of the transformer, the load current will be

(2300/13.18+J13.75)
=(83.5—J87.1) amp
=120 amp

The voltage at the load will be

(83.5—J87.1) Z_L
=(83.5—J87.1) (12.13—J10.85)
=1975—J166 volts
=1980 volts

The per cent regulation of the feeder is

(2300—1980)/2300=13.9%

This figure is approximate since the power factor of the load will probably change with the voltage at that end, depending upon the kind of equipment composing the load, but it is sufficiently accurate to provide the required data for sound discussion.

Case 2. With automatic regulation for minimum of 95% power factor. Now assume an automatic power factor regulator to be installed with sufficient kva capacity to give 95% power factor at full load. (The expense is sometimes too great to provide capacity enough to give 100% power factor at full load unless the service requires it.) In the case of Fig. 1, there are 213 reactive kva when there are 2300 volts at the load; the required condenser capacity to bring the power factor at the load from 75% to 95% at 2300 volts is 112 kva.

At full load there would be 242

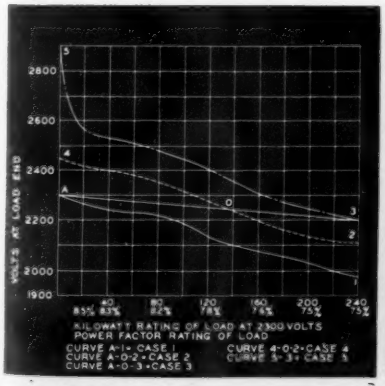


Fig. 2—Computed voltage curves at receiving end for different values of regulated and unregulated capacities, as discussed in Cases 1 to 5. These curves refer to the feeder of Fig. 1.

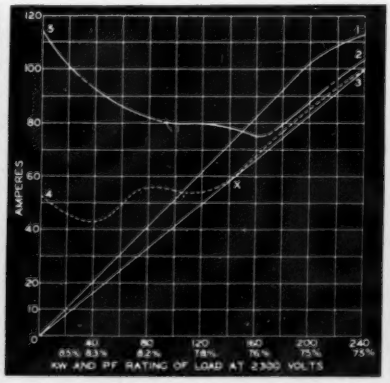


Fig. 3—Computed curves of line currents. Curve 0—1 is for Case 1, Curve 0—X—2 is for Case 2, Curve 0—X—3 is for Case 3, Curve 4—X—2 is for Case 4 and Curve 5—3 is for Case 5. Refer to Fig. 1.

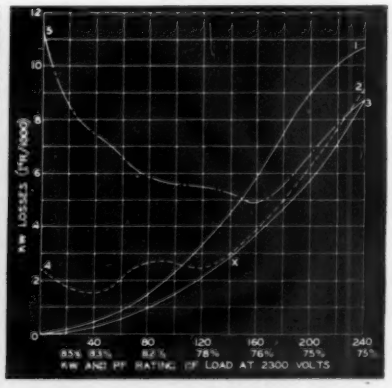


Fig. 4—Computed line and distribution transformer losses. Curve 0—1 is for Case 1, Curve 0—X—2 is for Case 2, Curve 0—X—3 is for Case 3, Curve 4—X—2 is for Case 4 and Curve 5—3 is for Case 5. These curves do not take into account the small losses (0.2%) in the corrective condensers nor the corrective equipment transformer losses, should such transformers be used.

kw at 95% power factor. Putting this in terms of impedance, R_{L1} =19.75 ohms and X_{L1}=6.5 ohms.

Adding this to the line and transformer impedances Z_F and Z_T given in Case 1, the total impedance is

Z_1=20.63+J9.4 ohms

With the same transformer ratio, the current will be

2300/(20.63+J9.4)
= 92.5—J42 amp
=101.2 amp

The voltage at the load will be

(92.5—J42) Z_{L1}
=(92.5—J42) (19.75+J6.5)
=2098 —J230 volts
=2110 volts

The per cent regulation of the feeder is

(2300—2110)/2300= 8.25%

The power factor would reach unity at about one-half load.

It will be noted that full rated load is not furnished at the distribution end due to the voltage drop in the line.

Case 3. With automatic regulation for 100% power factor at all loads. Suppose the automatic power factor regulator had sufficient capacity to make the load power factor 100% at full load. This would require a 213 kva condenser.

Two hundred forty-two kw at 100% power factor, 2300 volts, is equivalent to an impedance of Z_{L2}=21.9 ohms, in which R_{L2}=21.9 and X_{L2}=0 ohms.

Adding this to the line and transformer impedances Z_F and Z_T given in Case 1, the total impedance is Z_2=22.78—J2.9 ohms.

With the same transformer ratio, the current will be

2300/(22.78+J2.9)
=100—J12.7 amp
=100.8 amp

The voltage at the load will be

(100—J12.7) Z_{L2}
=(100—J12.7) 21.9
=2190—J278 volts
=2210 volts

The per cent voltage regulation is 3.9%.

Case 4. With fixed capacity and no automatic regulation — minimum of 95% power factor. In Case 2, let there be a fixed condenser installed instead of the power factor regulating equipment and let the minimum load be 20 kw at 85% power factor. This might be an industrial plant with only a few lights burning at night with some small fans and pumps running, or it might be an office building. Twenty kw at 85% power factor means there are 12.4 lagging reactive kva in the load equipment. Subtracting this from the 112 leading kva of fixed capacity and neglecting the 0.2% losses in the condenser, the total reactive kva of condenser and load is 99.6 reactive kva. The load being 20 kw, the power factor of condenser and load will be 19.7% leading. This is equivalent to an impedance of Z_{L3}=51.3 ohms (capacitance).

Adding these impedances to the line and transformer impedance given in Case 1, the total impedance of transformer, line, condenser and load is 11.18—J48.4 ohms.

With the transformer ratio given in Case 1, the current is

2300/(11.18—J48.4)
=11+J44.7 amp
=46 amp.

The voltage at the load will be

(11+J44.7) Z_{13}
=(11+J44.7) (10.3—J51.3)
=2408—J104 volts
=2409 volts

Hence, there is a rise in voltage at the receiving end of 109 volts, or about 4.7%, which fact is sufficient in some cases to discourage the use of fixed condensers. Obviously the only way to get good power factor at the load safely and economically is to use variable capacitance, automatically regulated.

At times when there is no load at all on the feeder, the voltage will reach higher values, as may be seen by curve 4-0-2, Fig. 2.

Case 5. With fixed capacity and no automatic regulation — minimum of 100% power factor. In a similar manner if may be shown that if the capacitance of Case 2 were not regulated and the minimum load of Case 4 exists, the power factor would be 9.9% leading; the current would be

14.5+J97 amp
=98 amp

and the voltage

2567—J126 volts
=2567 volts

The ratio of series inductance in the line and transformer to the capacitance in the condenser has reached such a point that the condition of resonance is becoming manifest. Curve 5—3, Fig. 2, illustrates voltages for different loads and power factors. Note the rise in voltage at no load. The no load losses in this case would be greater than the full load losses, making the fixed condenser very undesirable from an operating point of view even if the voltage rise could be tolerated.

Consideration of the losses for the various cases will be given in the section under "Line Current and Losses." (*See Next Issue*)

Voltage Curves. In Fig. 2 are given computed curves for Cases 1 to 5, illustrating the voltages at the load for different rated loads and power factors. In some feeders, the power factor will be lower at light load than at full load, and in others it will be higher, depending upon the number of small motors, transformers, lights, etc. This is simply an arbitrary case characteristic of many feeders.

The loads marked are *rated* loads based on 2300 volts at the load end; but, since rated voltage is not always reached at full load current, the actual load in kw will not be the same as marked, varying for different voltages at the load end. The actual loads can be computed from Figs. 2, 3, and 4.

(A concluding article on this subject by Mr. Stivender will appear in a following issue. It will include a discussion of regulated capacity as a means of maintaining constant voltage at a receiving point and the effect of regulated capacity on line current and losses.)

Unique Substation Design

(*Continued from page* 21)

eled panels firmly in place. The main entrance doors as well as all the sash and frames are aluminum, and are of modernistic design to harmonize with the architecture of the building.

The equipment includes automatic reclosing of the circuits, with instantaneous reclosing on the first outage; metering equipment of recording rather than indicating type; voltage regulators of new, improved type, responding faster and maintaining steadier voltage; and a number of improvements in both equipment and plant which render the building more secure from fire, lightning, explosion and other dangers. The control board is of all-steel construction, completely enclosed. The synchronous condenser housed in the smaller building corrects power factor and maintains constant voltage on the 13.2 kv bus.

Sheffield Completes Its Distribution System

By George H. Watson

THE first and only municipal distribution system in the Tennessee Valley territory to be built entirely new so far is that for Sheffield, Alabama, one of three cities grouped around Wilson Dam.

This is the only city to date voting for municipal operation which did not consummate a deal for purchase of existing electric distribution facilities. A purchase contract satisfactory to both parties could not be negotiated between the city and the Alabama Power Company, which had held the power and light franchise in the city for several years.

With the aid of a federal loan and grant the city has just completed its new system and has taken over service of the last customers of the Alabama Power Company. The latter has dismantled its lines and withdrawn from the city whose municipal system is now being served by TVA power from Wilson Dam, located near the city limits.

The power company extended every cooperation during the construction of the municipal system which embodies a number of modern refinements. Lines were built under or over the power company's lines as conditions required. The same house wiring was used in most cases.

The municipal system serves 1,258 residential and 430 commercial and industrial customers. The main distribution substation has a capacity of 1,500 kva. It is the feeder point for the whole system. It has an incoming 12 kv transmission feeder from Wilson Dam. Service out of the main substation consists of two 12 kv industrial feeders, two 4 kv domestic and commercial feeders, and two series lighting circuits. One of the lighting circuits, rated at 6.6 amperes feeds all overhead street lighting and one underground 20-ampere circuit feeds the white way system.

The main substation is of the automatic, non-attended type. There are four 500-kva transformers, one reserved for standby purposes. Space is provided on the substation lot for another unit of the same capacity as the one in use. The lines are designed to take care of anticipated load increase for the next 10 years.

All poles and crossarms for the distribution system are of creosoted southern pine. Most poles are of Class 4; none inferior to Class 5.

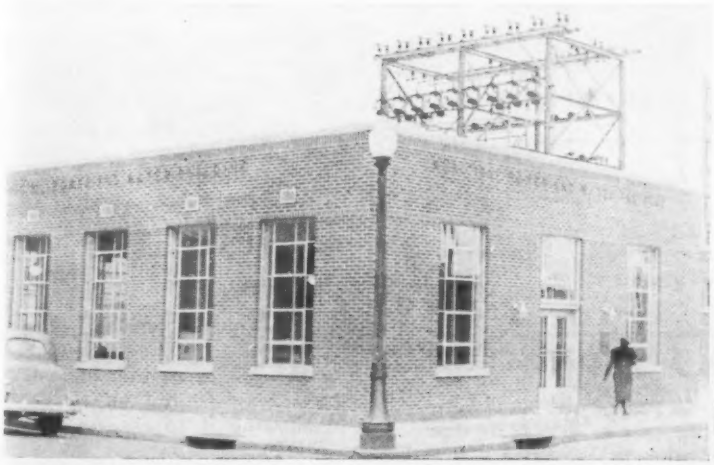
The incoming feeder line from Wilson Dam carries No. 4 2/0 stranded copper on standard NEA crossarms. All pole wiring in the distribution system is bare copper on standard NEA crossarms or secondary racks. The racks have 8 inches between conductors for secondaries. Service wires are all insulated. Meter installations are made with SAE concentric cable with 2 or 3 wires as required, except on industrial or power circuits, which are 4 wire.

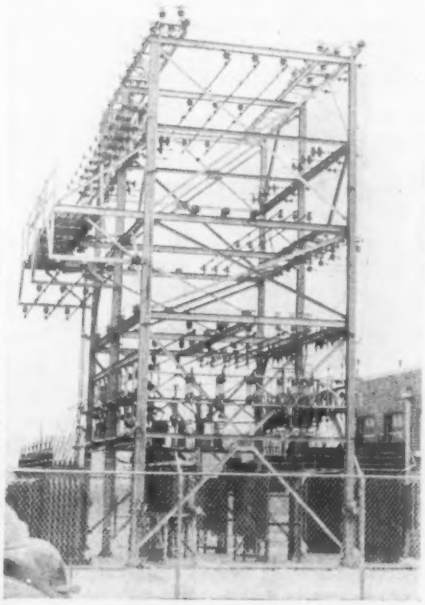
All meters are of the outdoor socket type. The cables are protected with either weather-proof bushings or "weatherheads." No cables are left open.

Equipment used on the job consisted of about 1,500 meters, 1,550 poles, 169 transformers ranging in size from 1½ to 100 kva, 300,000 feet of secondary wire, 304,000 feet of primary wire, 188,000 feet of street lighting wire, and 104,000 feet of transmission line wire. The city built its own transmission

(*Continued on page* 38)

The city of Sheffield, Alabama, has just completed construction of a municipal transmission and distribution system which enables it to distribute TVA power. One of the features of the office building shown below is its electrical heating equipment for winter air conditioning. The 1500-kva substation is shown at the right . . .





APPLIANCE Service

Refrigerator Shaft Seal Replacements

By Allen Parker

FOR years the refacing of shaft seals has been a problem and I am quite sure every service man has had his share. However, since many service men may be using the long, tiresome, expensive and obsolete method of refacing shaft seals, I would like to explain for their benefit some of the new developments that the refrigeration field has provided for this type of service.

Without a doubt the greatest amount of seal trouble came in 1933 and 1934. At that time the old reliable method was to remove the seal and polish the shaft facing with a special cutting paper and hand tool. This did not prove any too successful as precision work was not guaranteed and the labor involved was great.

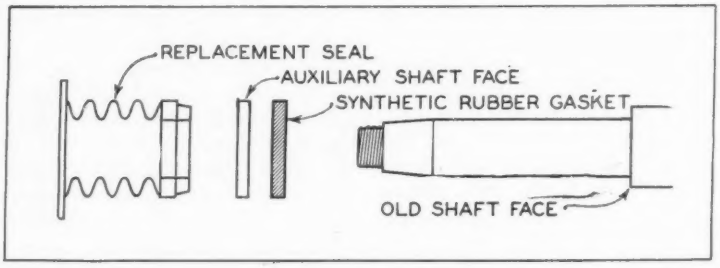
In our shop we set up some elaborate equipment consisting of a lathe and a special high speed grinder. The job was accomplished by removing the crank shaft from the compressor. With the shaft revolving in the lathe, we used the grinder to reface it.

This insured perfect workmanship but the time element on the job was still too great. This method was doomed because of high cost.

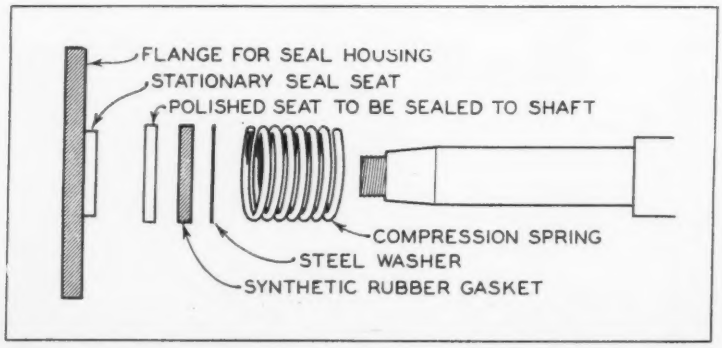
However, one manufacturer proved to be a life saver when he produced a seal to be substituted for the original equipment. This seal was called a rotary seal and could be installed on the job in a few minutes. There was no refacing to be done, as an auxiliary shaft face was furnished that could be sealed to the shaft with a synthetic rubber gasket. The principle of the seal was to have one sealing surface on the seal flange plate and the other, a polished steel ring, sealed to the shaft with a pressure spring back of it.

This type of seal has proven very satisfactory from every standpoint and since its innovation almost every manufacturer has put into production what is known as a replacement seal, which incorporates all the features of the original bellows seal but makes use of the polished steel ring with the synthetic rubber gasket.

Either the rotary or replacement seal will serve very satisfactorily and may be installed quickly and efficiently at an economical price. The only precautions to observe is to watch for high temperatures such as might be encountered in a bake oven, or the use of certain solvents which will ruin the synthetic rubber gaskets.



Almost every manufacturer now offers a replacement seal which incorporates all the features of the original bellows seal but makes use of the polished steel ring and the synthetic rubber gasket. Such seals must be installed cautiously in installations subject to high temperature and the use of certain solvents must be avoided . . . .



One manufacturer proved to be a service man's "life saver" when he produced a seal which could be substituted for original seal. This was called a rotary seal and since no refacing was required it could be installed on the job in a very few minutes. Operating principle involved an auxiliary shaft face that could be sealed to the shaft with a synthetic rubber gasket, with the other seal surface on the seal flange plate.

Appliance Service Hints

The mistake of putting alcohol into menthol and freon refrigeration jobs in an effort to prevent freezing of expansion valves where moisture has entered the system has been proven recently. It fails to stay in solution and turns to a jelly-like substance.

Under some conditions, alcohol causes a chemical reaction or copper plating.

* * *

Wire, copper tubing, or fittings can be weatherproofed by wrapping them with rayon ribbon and then saturating the ribbon with acetone. The acetone solidifies the ribbon into a cellulosic mass. Acetone can be purchased at any drug store.

* * *

A sulphur dioxide refrigeration job that is partially sticking from moisture in the system can be freed and most of the sludge removed from the system by injecting a few ounces of Xylene into the crankcase and allowing it to operate a few

(*Continued on page* 38)

MOTOR Service

Small Points of Importance In Armature Winding

I—Old Style Armatures

By A. C. Roe

Railway Motor Engineer,
Westinghouse Electric & Mfg. Co.

REALIZING that many winders fail to appreciate the importance of many minor factors in armature winding and insulation, Mr. Roe, author, engineer, and practical workman, has written a series of short articles, discussing only one phase of the subject at a time. The following article is the first of this series. Others will follow.

A FEW inches of thin iron at the rear or pinion end of the coil support on an armature has an important bearing on the finished winding. The iron is the vertical section of the older type of end bell, referred to as *B* in Fig. 1.

In earlier days such an inclosing section of iron acted as a protection by throwing out any oil that might have worked its way towards the windings; it also protected the end windings from mechanical injury when the armature was being handled or rolled on the floor during repairs. A canvass hood on top of the winding, Fig. 1, sealed the rear end against the entrance of dirt or other foreign particles.

This vertical section had some disadvantages. The winding possessed a low heat radiation, for although a fan was provided, not shown in the accompanying diagrams, the hood was an effective blanket in retaining the heat and preventing successful ventilation. The vertical section limited absolutely the amount of expansion that the coil-windings could undergo, and hence restricted them from effectively settling into place. This space limitation also made the job of winding difficult. Furthermore, the very shape of the section—as it curved from a vertical structure to the horizontal part of the support, Fig. 2—made it extremely difficult to insulate, and became a source of grounds.

Improved bearings and maintenance practices eliminated the necessity for the end-bell type of coil support. In modern motors the coil supports are flat and the ends open. The older type of end bell can be converted to the modern type by a little machining, with resulting advantages.

The impressions made by the coil ends in the insulation on the vertical section are very obvious when an armature of this kind is disassembled. When the windings were first assembled they were snug against the insulated vertical section, but as the insulation dried out and shrunk, chafing and looseness began its work; and trouble occurred with loose bands, grounds, and short-circuits.

When rewinding an armature with end bells, insulating materials must be cut into segments of circles, called "caps," and applied a few thicknesses at a time to make a snug fit on the curving surface. Then if the core has spread or too much insulation has been applied to the end bells, it becomes difficult to wind the armature.

In any case, more care must be exercised in shaping and banding the rear coil ends on armatures using the old type end bell, as the ends must be set close to their final position and clearance allowed for settling and binding under band pressures. Between the iron and coil ends there is required a layer of insulation at least one-eighth of an inch thick, and Fig. 1 shows how this encases the winding and restricts heat radiation.

The dotted line on the bottom section of the coil support in Fig. 1 indicates how the vertical section can be cut off at A to form a modern type of coil support.

When this job of conversion is undertaken, it is important to start the cut where the upper section starts to make the bend from the horizontal to the vertical, A Fig. 1. The distance from the extreme outer edge of the end winding to point A should be ⅜ inch at least, Fig. 2. This arrangement permits the core insulation to extend out past the end of the iron but not to project beyond the winding.

Where possible it is best to machine a flat section at the outer end of the support at least one inch wide, and at the near edge of this flat surface to machine a recess, B,

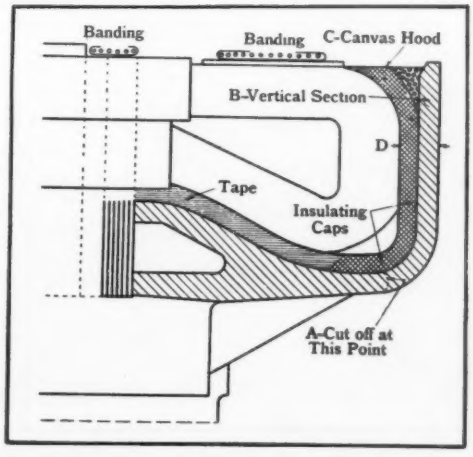


Fig. 1—Cross section of an old type of armature winding. The vertical part, B, gave trouble in rewinding because the coils would often bind before they were properly seated . . . . . .

Fig. 2, about ⅜ to ½ wide at least, and 1/16 to ⅛ inch deep. Then, in insulating the new coil support two or more layers of treated fuller board strips 0.056 inch thick are used, cut wide enough to cover the flat section and to extend at least ¼ inch past the end of iron support. Mica sheet can be used instead of fullerboard if Class B insulation is desired. The ¼-inch extension provides creepage space between the core and winding.

The method of insulating is as follows: Cut a hood from light duck, shellac the core, place the hood over the flat spot and shellac it. Then, wind the cord, A, Fig. 2, over the hood in the recess B, allowing the remainder of the canvass temporarily to hang out beyond the iron. Apply the fullerboard strips, shellac the outer surface, and then pull the hood over the fullerboard back towards the core. Tape the rest of support with 0.010-inch treated fabric tape, catching the end of the hood under this tape, as shown in Fig. 2.

By machining off the old type of end bell to produce the modern type of coil support, the rear end winding has a slight blower effect and, being open, radiates heat readily. The coils can be shaped and wound easily, and the end winding can be arch-bound in the banding process. The clearance at the end of the winding will be increased by about 70% of the dimension D of Fig. 1.

The benefits to be derived from cutting off the end bells more than justify the slight machining costs, and even on the first rewind the time saved in insulating the core and shaping the rear coil ends more than offset the machining time. In addition, the result is an improved winding.

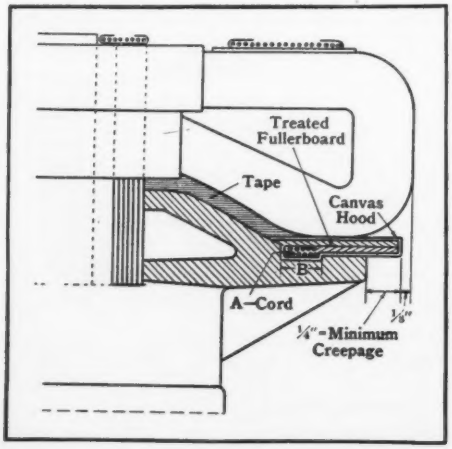


Fig. 2—By cutting off the iron section at point A, Fig. 1, the result is a more modern type of armature, as shown here. This figure shows also how the coil support is insulated with fullerboard and canvass . .

Tips On Refrigerator Motor Service . . .

By C. C. Hewitt

THE average refrigerator service man is not expected to be a motor expert as well, but there are a few simple tests that will enable him to decide whether trouble exists in the motor. Some motor repairs can be made on the job; others had better not be attempted except in the motor shop.

If a fuse has blown on the line it may indicate that the motor needs attention, but you cannot be certain until you check over conditions. Temporary low voltage from the power lines may cause a fuse on the motor circuit to blow if the motor happens to be starting or running at the time. Overloading of the circuit to which the refrigerator is connected may be another cause.

To learn if this has happened it is necessary to inquire what other appliances have been plugged in on the motor circuit. An effort should be made to remedy the condition if possible; simply putting in a new fuse is a poor way to get around the trouble.

Several checks should be made on the motor. The belt should be removed and the motor should be observed when running without load. Another check is to try to move the drive end of the shaft up and down and sideways thus testing for bearing wear. Even a very slight amount of bearing play on many motors will prevent the motor from attaining full speed because when the rotor comes in contact with the stator it tends to lock in place as a result of the strong magnetic field. When there is evidence of excessive bearing wear the motor must be taken to the shop for repairs.

Another check is to turn the shaft by hand. Due to lack of, or improper oiling, one of the bearings may be dry or coated with a sticky gum. If this seems to be the case, pull out the yarn packing, apply a good grade of light motor oil directly to the bearing, and try to free the bearing. If this eliminates the trouble, replace the packing and fill with oil to the overflow line. Bearing trouble is quite common because few refrigerator owners give attention to the oiling of the motor, and when they do they either over oil it or use the wrong grade of oil.

When a blown fuse has been replaced or the automatic trip has been reset it is often found that the motor hums but will not start. This proves in most cases that there is trouble in the starting sys-

(*Continued on page* 38)

Service Organization Meets In Chicago .

The National Industrial Service Association reports the largest attendance in the history of the Association at its convention held in Chicago recently. Members gathered from all parts of the United States and parts of Canada.

The program included a wide range of topics covering both management and shop practice.

Among those from the South who addressed the convention were Gardner Hoffman, Tennessee Armature & Motor Works, Knoxville, who presented an accurate system of cost accounting for individual repair jobs, and M. M. Argo of Birmingham, Alabama, who told how to weld coils into commutators with a carbon arc.

Members of the Association were especially interested in the certification plan designed to raise the standard of repair shops throughout the country and thus secure customer recommendation for such shops. The convention gave its approval to the plan and a committee was appointed to develop a method for putting it into practice.

A national rebuilt motor exchange plan was also given consideration.

At the conclusion of the meeting new officers were elected for 1938 which include John E. Launder, Kansas City, president; Carl A. Sievert, Chicago, vice president; Paul G. Winter, Indianapolis, secretary, and Alfred L. Brown, Worcester, treasurer.

POWER COMPANY News

Exchange Committees Meet In Savannah . . .

THE Merchandise, Dealer Coordination and Sales Promotion and Advertising Committees of the Sales Section, Southeastern Electric Exchange, met in Savannah at the DeSoto Hotel on May 27th and 28th.

The Merchandise Committee headed by Hugh G. Isley, Carolina Power and Light Co., enjoyed a well rounded program of sales discussion. Among those who participated in the program and the topics they discussed were: Selective Selling, R. B. Roberts, Jr., Florida Power and Light Co.; Employee Selling, Barney DeRamus, Birmingham Electric Co.; Kitchen Planning, O. M. Jackson, Georgia Power Co.; Selling Electric Water Heating, R. H. Giedd, Florida Power Corp.; Meeting Gas Competition, J. E. Averett, Savannah Electric & Power Co.; and Selling the Little Customer, L. T. Smith, Jr., Gulf Power Co.

The Dealer Coordination Committee meeting included a discussion of a survey on dealer policies among member companies and other matters pertinent to dealer work.

Among the topics discussed in the meeting of the advertising and sales promotion committee and those who led the discussions were: Advertising Media, B. E. Clark, Florida Power and Light Co.; Scheduling Work To Advertising Personnel, E. N. Pope, Carolina Power and Light Co.; Appliance and Load Building Advertising, R. W. Youngsteadt, Tennessee Electric Power Co.; Institutional Advertising, J. M. Robertson, Florida Power Corp.; Direct Mail Advertising, J. E. Averett, Savannah Electric and Power Co.; Outdoor Advertising by Utilities, H. E. Cox, Birmingham Electric Co.; Value of Characters, Symbols, and Slogans to Advertising Programs, C. M. Killian, Alabama Power Co.; Employee Information Programs, J. M. Stafford, Georgia Power Co.; and Radio Advertising.

Power Sales Engineers Aided By Exchange's Manual . . .

Many favorable comments have been received by the Southeastern Electric Exchange on the "Power Sales Manual" prepared by the Industrial Power Committee under the leadership of T. L. Bissell, manager power sales, Alabama Power Co. The manual includes more than 200 pages of power application data on the principal industries of the South, much of which is published for the first time.

Dallas Utility Promotes Adequate Wiring . . .

The entire building and electrical industry in the territory served by the Texas Power & Light Company (Dallas) has united to promote adequate wiring in both new and old homes by carrying on a carefully planned, long range activity.

The company has equipped a trailer with a sound slide film projector, adequate wiring films and records, together with wiring diagrams and a complete supply of literature. This coach is on continuous tour of the more than 500 towns served, carrying on promotional work with company employees, electrical groups and electrical inspectors.

Every effort is being made to enlist the complete support of all employees. The national emblem seal, stickers, and bulletin board posters are all used in this connection. In addition, all manufacturers' and jobbers' representatives contacting dealers are featuring adequate wiring materials and are placing installation information in the hands of each of their customers.

G. B. Richardson, vice president of the utility, states that "a great deal of interest has been taken in the adequate wiring program and to date a number of fine installations have resulted. The progress we have made is very gratifying."

Memphis Adds Surcharge To TVA Rates . . . .

The Memphis, Tenn., city commission voted final approval, recently, of a 15 per cent surcharge which is to be added to the basic TVA rate for electricity distributed by the City Power System. According to announcement, by Tom Allen, chairman, the surcharge is subject to change by the city board at any time although no change is contemplated unless the surcharge is removed or adjusted in the event the city buys the Memphis Power and Light Company.

City representatives signed up more than 1,400 customers in the South Memphis territory.

Exchange's New Vice Presidents

Charles E. Ide, East Tennessee Light and Power Co., at left, was elected first vice president of the Southeastern Electric Exchange at its annual meeting. A. W. Higgins, Florida Power Corp., center, will serve as second vice president; and J. A. Longley, Tennessee Electric Power Co., as third vice president . . . . . .

ASSOCIATION Activities

Roaster Campaign Sponsored . . .

A SIX weeks roaster campaign was initiated by the Electric Institute of Washington on May 23 and will continue into July. Featuring "A Chicken with Every Roaster," the campaign was opened with an evening meeting for salesmen, dealers and distributors.

Demonstration and display of roasters will be carried on at Institute headquarters, 50,000 bill inserts will be mailed to customers by the local utility and a 30-page booklet, "Modern Menus," will be distributed to 8,000 apartments throughout the territory. Also, a colorful window or counter card, suitable for the background of a roaster, and carrying the appeal, "A Roasting Chicken Included with Each Purchase of a Roaster," is being offered to all participating dealers.

During the campaign, the home service department of the utility is offering a free call on all roaster owners who experience any difficulties in the use of their roaster.

The special offer of a roasting chicken is confined to sales of roasters listed at $17 or more. The chicken is delivered to the home on the day following the sale, together with a menu for preparing a chicken dinner, a sponge cake and a frozen custard dessert. The main purpose of the special offer is to make the first roaster cooked meal as easy as possible, thus giving assurance to the housewife that a roaster cooked meal can be successful.

Short Electrical Course Sponsored In N. C. . .

The North Carolina State College of Electrical Engineering, in cooperation with the North Carolina Board of Examiners of Electrical Contractors and the North Carolina Association of Electrical Contractors, is offering on July 13, 14 and 15 a short course for electrical contractors, inspectors, electricians and others interested in electrical installation and practices.

The purpose of the short course is to stimulate discussion and to promote an exchange of ideas among those present as well as to offer them technical information which will be of value in the pursuit of their work. Further information relating to the short course may be obtained by writing the College.

Florida Contractors Plan Mid-Summer Meeting .

The Florida Association of Electrical contractors and Dealers will hold its mid-summer meeting at Key West during the week of August 14.

This will be a two-day meeting, one day being devoted to business and another to recreation. On the morning of the first day, a business meeting will be held which will be open to all members of the industry. Closed meetings for contractors, jobbers and electrical inspectors will be held on the afternoon of the first day.

The first day's activities will be concluded with a banquet and entertainment in the evening.

An all-day fishing trip and fish fry on the beach will be the feature of the second day's activities.

Attic Ventilation Group Meets In New Orleans

Attic ventilation equipment sales in New Orleans were given considerable impetus as a result of a meeting conducted recently for the benefit of electrical contractors and others interested in attic ventilation.

The meeting was held in the conference room of New Orleans Public Service and Frank G. Burns presided.

The principal speaker was George D. Smart of the Federal Housing Administration who told of the government insurance plan which had been developed by F.H.A. to assist the financing of permanent improvements such as attic ventilation.

Among those present at the meeting were C. S. Barnes, J. Dugan, L. Korn, J. Pantall, T. R. Dailey, J. H. Gill, M. R Grevenberg, A. L. Oesterle, C. V. Bankston, A. A. Farish, D. L Craton and J. H. Miller.

North Carolina IAEI Meets

The North Carolina Chapter of the International Association of Electrical Inspectors held its summer meeting June 21 and 22 at the George Vanderbilt Hotel, Asheville, N. C.

"Electric Jubilee" Results In $64,000 In Sales . . .

A 24-hour "Electric Jubilee," conducted by the Electric Association of Kansas City recently, resulted in sales totalling $63,900.

The first notice salesmen had of the activity was through the receipt of a telegram Sunday evening, calling for attendance at a big breakfast rally. More than 200 salesmen, dealers and distributors heard the plan outlined at this meeting.

The objects of the entire activity were to sell as many major electrical appliances as possible in a 24-hour period, to prove the value of intensive personal salesmanship, and to prove the value of definite evening appointments by salesmen.

Thirty-seven dealers and three distributors participated.

Included in the total was $4,350 in beverage coolers sold to drug stores and 10 ranges, 10 dishwashers and 10 garbage disposal units sold to a single residential builder. Major appliances sold included 74 ranges, 148 refrigerators, 98 radios, 53 washers, 11 water heaters, 10 dishwashers, 10 garbage disposal units, 14 beverage coolers, and 4 water coolers.

Dallas Electric Club Concludes Season .

The Dallas Electric Club, Dallas, Texas, held its final weekly luncheon meeting of the season at the Baker Hotel, May 30. As has been the custom during the past years, the club will hold no meetings during the summer months.

CODE Discussion

Motor Circuit Panel Bus Calculations . .

FROM the *News Letter* published at intervals by the Louisiana Rating and Fire Prevention Bureau, New Orleans, comes the following interesting discussion on the calculation of bus bar capacities for motor circuit panels. The news letter is edited by George Welman, electrical engineer for the Bureau, who is well-known among electrical inspectors and contractors in the South.

"We have searched the code standard and handbooks for some definite rule to guide manufacturers in figuring against each other on panelboard jobs for motor branch circuits and sub-feeder panels but not a word is said about bus bar capacities for motor circuit panels. We find a lot about branch lighting circuit panels but the big stuff we have to figure out ourselves.

"Question: Suppose we have a motor branch circuit panel to quote a price on for supplying 2-30 hp squirrel cage motors; 1-15 hp motor and 1-10 hp motor with three extra circuits for 10 hp motors. What size bus bars shall be used? Shall the capacity of the bus bars equal the total current rating of the switches and fuses for each motor branch circuit or shall we be permitted to use bus bar capacity of a size corresponding to the feeder size that supplies the cabinet?

"Answer: A rather simple and sensible answer would be to provide bus bar capacity of sufficient size to supply the load for which the feeders provide. Yes, this is sensible but will inspectors require bus bars equal to the combined rating of all the switches and cut outs?

"The problem is to have specified standards for motor circuit panels based on somewhat similar demand factors that now apply to motor feeder circuits.

"According to our ruling, the size of the bus bars for a motor branch circuit cabinet mentioned should be 25% heavier than the total rating of all of the motor circuits, and the current would be obtained by simply adding the ratings as follows:

2—30 hp 220 v 3-phase motors at 77 amp. each equals 154 amps.

1—15 hp 220 v 3-phase motors at 38 amp. each equals 38 amps.

1—10 hp 220 v 3-phase motors at 27 amp. each equals 27 amps.

3—Spare 10 hp motor circuits at 27 amp. each equals 81 amps.

Total: 300 amps. Plus 25%. 75 amps. Total load on bus bar: 375 amps.

"This is slightly different from the method used by the code in determining conductor sizes for a group of motors. See Section 4314. In this section we assume that only the largest motors will ever be overloaded 25% and that all of the other motors will never have more than a full load or perhaps it is thought that all of the motors could not possibly be overloaded at the same time and by allowing for a 25% overload on the largest motor, conductors of sufficient size would be provided.

"In panel board construction, the situation is somewhat different and we are informed that manufacturers of panelboards for relatively large current values generally provide bus bars of 100; 200; 300; 400 amperes, etc., and do not bother about any current values between the third figures. They are only concerned with figures that would multiply the size by two or three times the actual load values, which would be the case if we were to demand bus bars equivalent to the combined switch or fuse rating for motor branch circuits.

"Bus bar copper is usually figured at 1000 amperes per square inch and the current rating of the bus bar should be stamped on the copper by the manufacturer. A 375 ampere bus bar would measure 2 inches in width and 3/16 inches in thickness, according to Underwriters' Laboratories Standard for universal copper bar sizes.

"Closely related to the above problem is the switch rating for motor circuit panelboards. Should the switches be rated in hp for motors of 50 hp or less? Of course, we know that the switches should be so rated when the panelboard switch is the disconnecting switch but does this rating apply when we have in addition to the panelboard switch another disconnecting switch ahead of the motor control device?

"Again we have a common sense problem. When there is a motor disconnecting switch ahead of the motor control device we assume that this switch will be used in emergency and that the panelboard switch will only be used to render the fuses dead when replacing fuses and the panelboard switch in the latter case need not be rated in hp. In the event that the panelboard switch is used as the disconnecting switch then the hp rating applies."

Convention Plans Underway For Southern Section . . .

Plans are progressing rapidly for the annual meeting of the Southern Section, International Association of Electrical Inspectors, which will be held in Jacksonville, Florida, September 12, 13 and 14. The completely air - conditioned George Washington Hotel has been selected for convention headquarters.

Walter A. Stall is general chairman of the tenth annual convention committee. Other committee chairman are as follows: R. Earle Ward, Ward Engineering Co., finance; J. F. Ulrich, city electric department, publicity; T. E. Satchwell, Ace Electric Co., entertainment; W. O. Henderson, Henderson Electric Shop, arrangement and reception; J. A. Meier, Raybro Electric Supplies, Inc., transportation; R. P. Smith, Westinghouse Electric Supply Co., exhibits; C. S. Graham, utilities inspector and rate engineer, program; and Mrs. W. A. Stall, ladies entertainment.

Underwriters' Radio Standards Adopted .

The American Standards Association recently approved Underwriters' Laboratories' new "Standard for Power-Operated Radio Receiving Appliances" as an American Standard.

The new Standard which was issued recently as a fifth edition, incorporates many requirements which were not contained in previous editions. The published requirements are based upon records of tests and field experience and apply, from the fire and accident point of view, to both the construction and performance of receivers.

WHOLESALERS' Activities

Westinghouse Co. Opposes "Courtesy Discounts" . .

A statement and clarification by the Westinghouse Company and its agent jobbers of their policy of opposition to "courtesy discounts" on household electric appliances was the most significant action taken at the 26th annual meeting of the Westinghouse Agent Jobbers' Association, at Hot Springs, Va., May 27-31. The announcement was made by J. S. Shaw, vice president of the Moore-Handley Hardware Company, Birmingham, Alabama, president of the association under whose leadership the action was taken.

"We are, and have always been, opposed to price concessions of this type," Shaw said to the 125 members attending the meeting. "Courtesy discounts, or special price concessions to friends and business associates, are manifestly unfair to the consuming public. Moreover, were such a practice allowed it would completely demoralize our dealer organization. If purchases direct from the jobber or manufacturer were permitted, it would simply be taking business from the dealer that he is rightfully dependent upon."

Following the presentation of the Westinghouse Company's attitude by R. E. Imhoff, sales manager of the Merchandise Division, the Association unanimously adopted a resolution aimed at clarifying its policies for the trade and the public.

At the election of officers J. S. Shaw was re-elected president of the Association; A. E. Allen, vice president; N. G. Symonds, vice president; H. M. Moock, secretary; L. B. Bournes, assistant secretary and treasurer, and J. J. Jackson, counsel.

Mississippi Wholesaler Opens Branch House

The Tennessee Valley Electrical Company, electrical wholesale supply house of Tupelo, Miss., has just opened a branch in Columbus, Miss., at 220 Fifth Street, South.

The Columbus store will be under the management of G. W. McCarter, who has had considerable experience in the wholesale electrical supply business. T. D. Stinson, of Columbus, will also be connected with the store. The Columbus territory will be covered by salesmen working out of the Columbus office.

The building has been remodeled to fit the needs of the new company and supplies and stocks have been received.

Managers and apparatus salesmen of the Tafel Electric and Supply Company are shown here at their annual meeting, for the purpose of keeping the organization informed on developments, improved design, and new selling methods including advertising, direct mail and personal salesmanship.

One entire day is devoted to the meeting and each new development is discussed with the manufacturers' representatives. Specific problems are discussed in each product presentation.

The Tafel Electric and Supply Company are Westinghouse distributors, with offices in Louisville, Lexington, and Nashville.

Contest Stimulates Sales During Dull Season . .

The Riechman-Crosby Co., Memphis, Tenn., has just concluded a contest among their salesmen to increase sales on electrical materials. The contest began March 1, and closed July 1. A quota was given each salesman, and the winner was awarded a General Regulator Co.'s kitchen window ventilator.

This four-month period has been generally conceded to be "slow in sales," but the Riechman-Crosby Co. endeavored to prove that this theory is incorrect, and that just as much electrical materials can be sold at this time of year, as during the other months.

Wholesalers' Sales Continue Downward Trend In April .

The dollar volume of wholesale trade declined 18.5 per cent during April, 1938, as compared with April, 1937, according to reports from almost 1900 wholesalers. Sales in April, 1938, were down 4.7 per cent in comparison with previous month.

Dollar sales of electrical goods wholesalers declined 31.3 per cent in April, 1938, in comparison with the same month of 1937. Sales in April, however, increased 3.7 per cent over March, 1938.

In the South Atlantic states, electrical wholesalers dollars sales decreased 33.8 per cent in April, 1938, in comparison with April, 1937, but increased 8.2 per cent in comparison with March, 1938. End of month inventory (cost) decreased 8.8 per cent in April, 1938, in comparison with April, 1937, and decreased 4.5 per cent in comparison with March, 1938.

In the East South Central states electrical wholesalers dollar sales decreased 31.3 per cent in April, 1938, in comparison with April, 1937, but showed no change from March, 1938. End of month inventories in these states increased 2.9 per cent in comparison with the same month a year ago, and increased 4 per cent in comparison with March, 1938.

In the West South Central states sales in April, 1938, decreased only 26.6 per cent in comparison with April, 1937, but decreased 4.7 per cent in comparison with March, 1938. Inventories were down 8 per cent in comparison with the same month a year ago and 3.8 per cent in comparison with March, 1938.

MANUFACTURERS' News

Nash-Kelvinator Out To Prove That "Sales Mean Jobs" . .

First skirmish in what promises to be a major nationwide campaign against the buyer apathy that has slowed down the normal processes of industry was fought last week, with salesmen in all lines discovering that synthetic, hard selling effort does bring in rewards in sales.

On Wednesday, May 18, Lincoln, Nebr., became "proving ground" for a week for the National Salesmen's Crusade which on June 6 will be expanded to all parts of the United States by the founder of the movement, George W. Mason, president of Nash-Kelvinator Corporation.

The movement, sloganized by lapel buttons, pennants and banners bearing the words "Sales Mean Jobs" and appearing all over the city, is revealing that systematic hard work on the part of the retail salesman brings definite results in the form of sales and interested prospects.

A check-up of results of the first three days of the Lincoln experiment shows that refrigerator and household appliance salesmen in this city and the surrounding territory are averaging one sale for every ten "doorbell-ringing" calls.

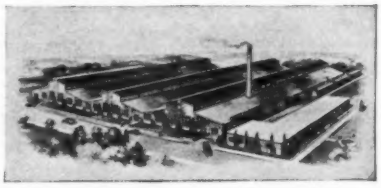
Four hundred and thirty-three calls made by salesmen in Lincoln and vicinity were analyzed by S. C. Mitchell, advertising director of the Kelvinator Division of Nash-Kelvinator Corporation, here for the campaign, and it was found that these calls resulted not only in direct sales of forty-two appliances, electric refrigerators and ranges, but in the uncovering of 98 definite prospects.

Forty-three per cent of these calls were of the "cold canvass" type, in which salesmen rang doorbells in between the addresses of those whose names had already been listed as possible prospects, Mitchell said.

George H. Mason, president of Nash-Kelvinator Corp., does a little "cold canvassing" himself in Lincoln, Nebr., as the National Salesmen's Crusade gets started.

Knox Porcelain Corp. Expands Plant For Fourth Time . . .

The Knox Porcelain Corporation, Knoxville, Tennessee, expands for the fourth time in twelve years. In this brief time the company has grown from 25,000 square feet of floor space, with 50 employees, to over 75,000 square feet of floor space and more than 400 employees.



Distribution has been extended from ten southeastern states to the entire United States and several foreign countries. So wide is this distribution that the sun never sets on all Knox products.

Production first was limited to porcelain knobs, tubes and cleats. Today the company is said to be the world's largest manufacturer of radio insulators and also produces sixteen-hundred other items of electrical merchandise.

The first expansion was in 1926, when the Knox Porcelain Corporation built a new kiln and added equipment for the manufacture of radio insulators, strain and pin-type insulators and secondary rack spools. Further expansion was brought about during the years between 1926 and 1936, in order to produce neon sign insulators, high tension insulators, all kinds of special porcelain and a complete line of wiring devices.

Because of the cramped conditions in the Assembly and Stamping Departments another new building was added in 1935. This addition practically doubled the previous floor space. Recent developments in the firing of electrical porcelain necessitated the installation of a continuous circular kiln in 1936. This more than doubled the capacity and called for more room early in 1938. The new addition of about 25,000 square feet of floor space has just been completed and modern up-to-date equipment has been installed.

Philco Corporation Invades Air Conditioning Field . .

Philco Radio & Television Corporation is invading the air-conditioning field on a mass production basis, according to announcement by Larry E. Gubb, president of the Philco Company. Its product is a portable air-conditioning unit called Cool-Wave which can be placed in any room of a home, in offices, hospitals or hotels.

Production has already been started on this new air-conditioner and a national promotion campaign has been planned for its introduction to the public.

The Cool-Wave unit is approved by Philco engineers, distributed by Philco and will be sold exclusively by Philco dealers throughout the country and in Canada. It is manufactured expressly for Philco by the York Ice Machinery Company, which has set up huge departments in its plants for the exclusive construction of Cool-Wave air conditioners.

Embodying a complete air-conditioning system in a specially-designed attractive walnut finish steel cabinet, the Cool-Wave unit occupies only little more than four square feet of floor space.

In introducing the new Cool-Wave unit, Larry E. Gubb, president of Philco Radio & Television Corporation, declared: "Air-conditioning for almost everyone is the giant American industry of the near future. It will be the center of the next big business upturn. If the long-awaited building boom should ever materialize—and I believe it will soon for there is an acute housing shortage in this country—modern air-conditioning will enter into the construction of even modestly-priced homes."

New "Rentschlerizing Equipment" Announced By Westinghouse . .

For killing bacteria and preventing mold in many fields including the meat industry, baking industry, hospitals, public eating and drinking places, the Lamp Division of the Westinghouse Electric and Manufacturing Company announces a new line of equipment for use in "Rentschlerizing."

Just as Pasturization is known as a means of sterilizing through the use of heat, so the Rentschler-James Process, or "Rentschlerizing" is known as a means of sterilizing through the use of selected ultra-violet radiations produced by Sterilamps.

The Sterilamps are slender rod-shaped glass tubes with effective lengths of 10," 20" or 30." Two types of fixtures have been specially designed for use with Sterilamps: SB-30 is suitable for walk-in refrigerators and other places where ceiling or wall mounting is desirable and is equipped with a flat Alzac-finished aluminum reflector. SC-30 is an open type fixture particularly designed for use in refrigerated display cases and shelves.

Both types are complete with sockets, terminal boxes and hardware.

Advertising Silex Glass Coffee Makers—the modern method of brewing better-tasting coffee—to millions of prospects, this huge, moving billboard has traveled 75,000 miles in the last two years.

Five-color advertising messages are painted on both sides, on the rear panel, and on the front panel.

♦

News About People

The Illuminating Engineering Society announced at its recent meeting at Briarcliff Lodge the election of **DeNyse W. Atwater,** manager of commercial engineering of the Lamp Division of the Westinghouse Electric & Manufacturing Company, as president of the Society for the year beginning October 1, 1938. Mr. Atwater is one of the best known figures in the field of illumination and has many distinctive accomplishments to his credit.

D. W. Atwater

* * *

The incandescent lamp department of General Electric Company, Nela Park, Cleveland, recently announced new managers for two of its sales divisions in the South.

Ralph Nungesser, until recently with Mississippi Valley Division, St. Louis, is the new manager of Southwestern Division of Dallas, Texas.

Ralph Nungesser

He succeeds H. D. Puckett who continues there in an advisory role. Mr. Nungesser joined General Electric in 1916.

W. H. Rademacher, formerly assistant manager of Mississippi Valley Division is the new manager of that sales division. He succeeds C. W. Bender who retired after completing 29 years of continuous service with G-E incandescent lamp department.

W. H. Rademacher

* * *

W. E. Hopper, manufacturers' representative with offices at 357 Marietta Street, Atlanta, announces that he now represents the Accurate Manufacturing Company, Garfield, N. J., manufacturers of friction tape.

* * *

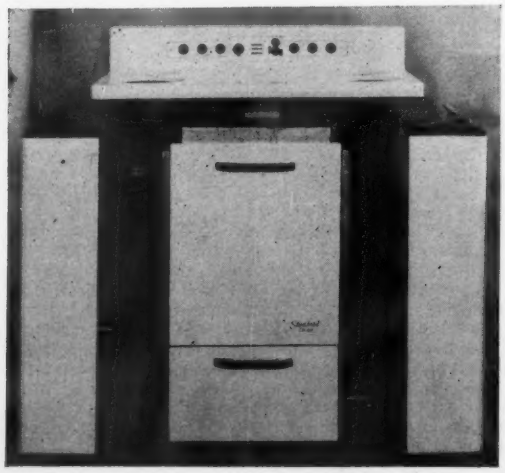
Friends of **Will R. White,** of Walker Electrical Company, Columbus, Ga., will be interested in learning that he is rapidly recuperating from his serious illness. Mr. White is now in Wittman, Arizona, and receives his mail in care of R. W. Myers.

Will R. White, Jr.

The interesting snapshot of Mr. White reproduced here was received through the courtesy of R. Y. Morgan, district sales manager, Economy Fuse & Manufacturing Company.

* * *

A. C. Howard has been named general manager of the Beloit, Wis-



♦

The completely welded unit type of construction inside and the porcelain panels then attached to this foundation as used in the Standard Electric Stove Co.'s Model 1536 is said to result in an exceptionally substantial type of construction, especially eliminating breakage of the porcelain. The oven is a one-piece welded construction with recessed heating elements

consin, plant of Fairbanks, Morse & Co., according to announcement by A. E. Ashcraft, vice-president in charge of manufacturing. Mr. Howard first became associated with the company twenty-two years ago and has been assistant general manager of the Beloit plant for six years.

* * *

Harry H. Knight and **Melvin W. Jackson**, of Dallas, Texas, announce the formation of Knight-Jackson Company, manufacturers' agents, to call on the electrical and hardware jobbers of the entire Southwest. Mr. Knight will devote his time to calling on jobbers while Mr. Jackson will concentrate on the industrial trade.

Dallas Engineering Company and Vent-A-Hood Company, both of Dallas, are among the companies which the new firm will represent.

* * *

C. C. Myrick, Jr., Atlanta, Georgia, who has represented the M. B. Austin Company, Chicago, for several years in the Southeast announces that the

C. C. Myrick, Jr.

states of Virginia and Mississippi have been added to his territory which now comprises almost the entire Southeast for the M. B. Austin Company.

* * *

Roy F. Druschky, southeastern manager of the Wagner Electric Corporation, died unexpectedly at his home in Atlanta recently. Mr. Druschky was a native of St. Louis and had lived in Atlanta for the last ten years.

George F. Schoen, long identified with the electrical industry of the South, died in Atlanta on June 16, after an illness of four months. Mr. Schoen was one of the principals of the Gilham-Schoen Electric Co., which he helped organize in 1918 and with which he was associated for eight years following its organization. For the past two years, he has been sales promotion engineer for H. C. Biglin Co. of Atlanta.

Both Mr. Druschky and Mr. Schoen were well known in the South and their passing is a distinct loss to the electrical industry.

* * *

Wagner Electric Corporation, St. Louis, announces the appointment of **Lowrie C. Barton** as branch manager at Atlanta in charge of electrical apparatus sales for the Southeastern territory comprising North and South Carolina, Georgia, Florida, Alabama and Tennessee east of Nashville.

L. C. Barton

Mr. Barton joined the Wagner organiza ion in 1934 as special representative on public utilities in the southern territory. He was formerly southeastern central station manager for Westinghouse Electric & Manufacturing Company.

Refrigerator Manufacturer Appoints Distributors . .

Completion within four months of a national organization for the distribution of its new Blue Flash Electric Table Top Refrigerators is the unique achievement that has been announced by H. D. Laidley, general sales manager, appliance division, of The Brunswick-Balke-Collender Company, Chicago. Starting almost from scratch in the middle of January, the Appliance Division, under Mr. Laidley, on May 15th had completed practically all of its appointments of distributors for the entire country. More than seventy districts are covered.

Manufacturers' Representatives Hold Annual Outing In June . .

The Southeastern Electrical Manufacturers' Representatives Club held their annual outing at Lithia Springs, June 4, entertaining their families and friends in the electrical industry.

The program included golf for the men, bridge for the ladies and an old-fashioned barbecue and dance for everyone.

The photos below show some of the participants. The golf foursome at the left turned in cards in the 70's. Reading from left to right are Guy Whitehead, Cleveland Electric Company, H. G. Reeves, manufacturers' agent, Ernest T. Loyd, president of the club and Paul Tewketsbury, Westinghouse Electric Supply Company.

In the photograph at the right are Guy Whitehead, Homer Gresham, C. H. McAfee, R. W. Carmichael, and C. A. Mickel, the last four all being associated with Graybar Electric Co., H. G. Reeves and C. W. Chapman, manufacturers' agents.

Live Line Maintenance Demonstrated by Film .

Shown below is the Tips Tool Company's display truck which is now touring the country under the supervision of Ken Best, live line engineer, who is making demonstrations and supervising jobs where hot line tools are used in line maintenance. Mr. Best has had many years of experience in hot line maintenance.

In addition to a complete display of both A. B. Chance Company and Tips Tool Company products, Mr. Best carries a movie projector with several films on various types of hot line work which permits him to make presentations to those who cannot assemble for a field demonstration.

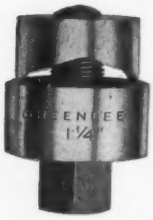
Because of the great interest exhibited by both management and men in these demonstrations, the Tips Tool Company has prepared several copies of the film which will be made available to company heads for private showing. Whenever possible the company will arrange for presentation by a company representative.

Further details may be obtained by writing Tips Tool Company, division of A. B. Chance Co., Centralia, Mo.

SAVE Time and Money with Greenlee Tools

Hydraulic Conduit Benders

Greenlee Hydraulic Benders are time and money savers, because they bend conduit quicker and easier than by other methods. In addition, they make smooth, even bends, eliminating many fittings and making it easy to pull in wire and cable. They are simple to operate and are readily portable.



Knockout Tools

Greenlee Knockout Punches and Cutters are time savers and profit makers, because they make it easy to enlarge holes in switch boxes, cabinets, etc. They form clean-cut holes quickly and accurately, without reaming or filing.

Other Greenlee Tools

Hydraulic Pipe Pushers
Joist Borers Bit Extensions
Electricians' Bits

Let us send Complete Information.

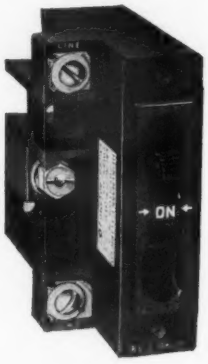
GREENLEE TOOL CO.
1707 Columbia Ave.
ROCKFORD, ILLINOIS

GREENLEE TOOL CO., 1707 Columbia Ave.
Rockford, Illinois
Please send complete information on:
☐ Knockout Tools ☐ Conduit Benders

Name _____
Street _____
City _____
State _____
My Jobber is _____ ES-7-38

Circuit Breaker Provides Motor Control . . . .

A small, compact circuit breaker manufactured by the Heinemann Electric Co., Trenton, N. J., now provides a fully electro-magnetic motor control device. It is designed for the protection of fractional horsepower motors up to 1 hp and is available in ratings from 250 milliamperes to 35 amperes.



A magnetic time delay unit takes care of harmless overloads but the breaker opens instantanously on heavy overloads and short circuits. The magnetic blowout contacts are designed to withstand short circuits and reduce arcing to a minimum.

All moving parts except handle are enclosed in black moulded bakelite case.

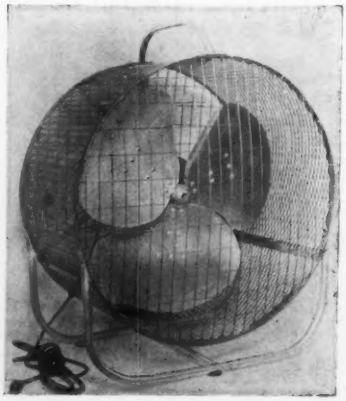
Cabinet Air Circulator

The Dallas Engineering Co., Dallas, Texas, manufacturers of Vent-A-Hood ventilators and Dallas fans, announce the development and manufacture of the new Dallas Cabinet Air Circulator.

The new fan is designed to rest on the floor and thus takes advantage of the cooler air found near the floor.

The fan is enclosed in finely woven wire mesh which protects bystanders against contact and injury. It has perforated metal sides and a chromium plated floor rest and handle. It rests on rubber feet.

The fan is especially recommended for offices, beauty parlors, stores, and locations where a large volume of air is desirable.



Combination Watthour Meter And Time Switch . . . . .

In a single unit an accurate watthour meter and an improved Telechron-motored time-switch register are combined in the new IR-30, a combination unit just announced by the General Electric Company, Schenectady, N. Y.

Savings in space, installation and maintenance costs, and inventory investment are among the advantages of the single-unit construction. Wide-limit accuracy is assured by incorporation, in the unit, of the established G-E I-30 watthour meter, which is suited for both large and small single-phase loads.

The meter is available in all ratings, with any one of three registers: single-dial, with contacts; double-dial with contacts; and double-dial without contacts. It is available for front connection or for socket mounting.

Signal Display Stand

To enable distributors to properly display Signal Vent Fans, the Signal Electric Mfg. Co., Menominee, Mich., is now furnishing a new display stand to jobbers.

This is a well-arranged display stand, made of steel construction

finished in red. It is 63½" high, 24½" wide, and 22½" deep, with free-rolling casters so that the stand when completely loaded, as in the illustration, may be easily moved about.

This stand is equipped with a place for each type of Signal Ventilating Fan. It is shipped knock-down, and may be assembled in a few minutes without tools of any kind. Any one of the fans may be removed from the stand without tools.

New Splash-Proof Motor Line Announced . . .

A new line of Splash-Proof Motors is announced by the Diehl Mfg. Co., Elizabethport, N. J.

Among the distinctive features which characterize this new line are: Sturdy cast iron construction; spe-

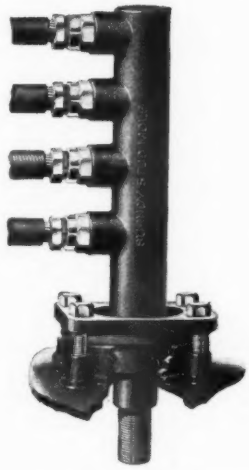
cially impregnated windings; effective baffling system which prevents entrance of water or falling particles; improved system of ventilation which assures low temperature rise; sealed ball bearings, accessible for lubrication in all mounting positions; conformation with N.E.M.A. specifications for splash-proof motors, furnished in all N.E.M.A. sizes and ratings.

Detailed information and prices may be obtained by writing the company.

Burndy Stud Mole For Underground Use . .

Burndy Engineering Co., Inc., New York, announces the Burndy Stud Mole, type ZMLD, a combined insulated multiple terminal and bushing that replaces porcelain bushings and gaskets on network protectors used in underground distribution.

The Stud Mole, designed to provide multiple connections in small



space and to seal out moisture and gases encountered in underground vaults, can be used with all types of cables—leaded or non-leaded. It may also be used for making multiple terminal connections on distribution transformers.

Ideal Introduces Motorized Brush Type Wire Stripper .

A new motorized brush type wire stripper especially designed for rapid, fine wire stripping has been intro-

At Last - - -

A REAL METER SEAL

that is just like money—hard to counterfeit

THAT WILL LAST

These new Superior Shurlok Vitriseals come in two-color combinations that won't peel, fade, corrode or deteriorate from the action of light, moisture, dirt, age or friction.

THAT IS MODERN

Take advantage of the seven colors (black, blue, green, red, yellow, orange and white). Give different departments in your company Superior Shurlok Vitriseals with your company name or emblem on them in different color combinations. Or change your color combinations every year.

THAT IS PROTECTED

Superior Shurlok Vitriseals are manufactured only in the Superior factory. They are sold only to and direct to those Utilities using apparatus equipped with Superior Shurlok latches. These seals are not sold in the open market.

If you haven't received your sample yet,
Write for it.

Superior Switchboard & Devices Company

CANTON, OHIO

*Been at it Since 1920

SUPERIOR
REG. U. S. PAT. OFF.

duced by the Ideal Commutator Dresser Co., Sycamore, Ill.

This machine cleanly strips cotton, silk, enamel, string asbestos covered wire, fine "Litz" wires and removes gummy insulation embedded in stranded wires. It is especially suitable for stripping rectangular or square conductors.

Driven by a ¼ hp motor, this stripper eliminates tedious hand-scrapping, does a faster, cleaner job more economically. Heavy metal guards in front of the revolving wire brushes and over the driving belts protect the operator's fingers and make the stripper safe to operate.

New Crossarm Brace Offers Many Advantages . . . .

A new crossarm brace, manufactured by the Electrical Materials Department of Hubbard and Company, Pittsburgh, Pa., is said to offer many advantages over conventional type braces.

The new crossarm brace is compact and light, being formed of one continuous piece of ⅜-inch, high carbon, steel rod. It is strong and easy to handle or install. In addition, in the case of two styles, only two pieces are involved in the construction whereas with standard braces there are eight to eleven parts including bolts, washers, nuts and braces. Because of the small number of parts involved, the cost is low and radio interference is nil.

Fiber-Glass Insulated Magnet Wire . . .

A new Deltabeston magnet wire, insulated with fiber glass, has been announced by the General Electric Company, Bridgeport, Conn., as an addition to the present line of Deltabeston asbestos-insulated magnet wire.

Deltabeston glass-insulated magnet wire, like Deltabston asbestos-insulated magnet wire, is available in round, square, and rectangular shapes. Further information may be obtained from the manufacturer.

Sheffield Completes Its Distribution System . .

(*Continued from page* 25)

line in order to get a more favorable rate from TVA.

The city has combined the operation of its power and light system with that of the waterworks which it has operated for years. The office building erected in connection with the substation, garage and shop is electrically heated in the winter and cooled in the summer.

H. W. Meeks is general manager of the city power and water department and H. E. Perry is line foreman.

The distribution system was designed by Lide & Adler, engineers of Birmingham, with W. J. Strickland as resident engineer on the job. The main electrical contract was held by the Universal Electric Construction Company of New Orleans. The metering and some other work was sublet to the Tri-Cities Plumbing & Electric Supply Co., of Sheffield.

The office and shop building contract was held by the Brice Building Company of Birmingham. The wiring for the building was done by Bethune Electric Company of Birmingham.

Appliance Service Hints

(*Continued from page* 26)

days with a filter in the liquid line. Xylene is a very thin dry oil that can be purchased from any drug store. The Xylene should be replaced with oil after the job is completed because of its low viscosity.

Tips On Refrigerator Motor Service . . .

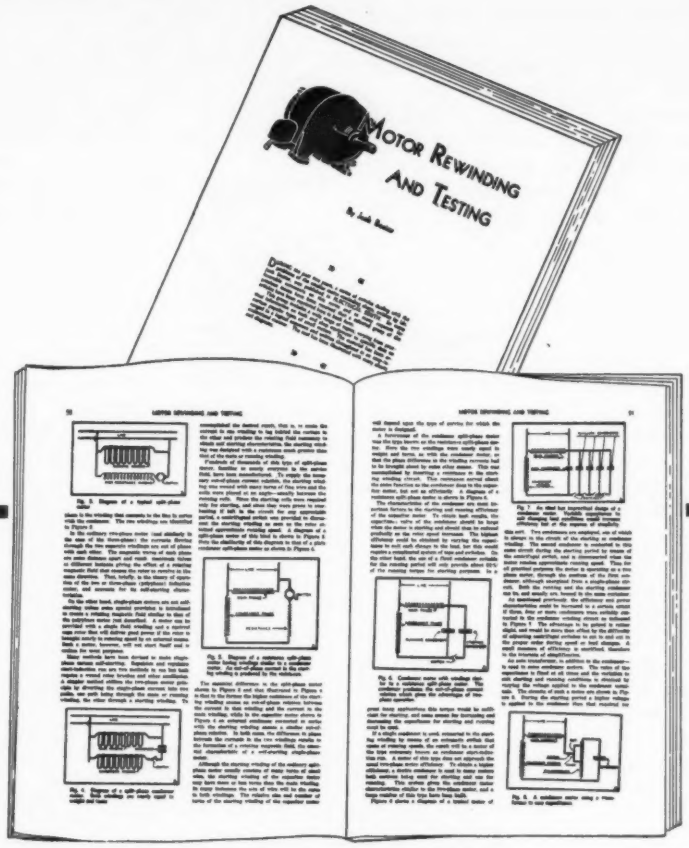
(*Continued from page* 28)

tem of the motor, but the exact nature of the trouble will depend on whether the motor is a repulsion-induction type, or one of the newer capacitor motors.

In the repulsion-induction type, a motor that refuses to start may have a short circuited armature, worn out brushes or defects in the throw-out mechanism. The armature in this type of motor is double acting. When starting, the rotor acts as a wound armature, but when the motor is running under full load, these windings are shorted together to make a straight induction type motor.

This short circuiting of the rotor windings when the motor reaches a certain speed is accomplished with centrifugal weights acting against push rods running through the core of the armature. These pins press against a metal drum surrounding the shaft and located inside the vertical commutator. Fitted in a groove around the outer edge of this drum is a "necklace" composed of individual copper segments strung on a wire or, in some types, a strip made from a continuous length of bent copper wire. Held by the action of the governor weights on one side, and the pressure of a coil spring on the

STEEL STRAND ◆ TELEPHONE WIRE
Crapo
GALVANIZED PRODUCTS
SPECIFIED BECAUSE OF PROVED PERFORMANCE
Crapo Galvanized Steel Strand has earned its enviable reputation for long, dependable, economical life by outstanding performances in actual service. That's why it so often is specified by leading utilities for the more important construction jobs. The heavy, uniform, pure zinc coating—applied by the Crapo Process—is notable for its adhesion and ductility; its ability to withstand bending and twisting; its lasting resistance to corrosion. Both the finished strand, and the wire from which it is made, conform in every detail to the most rigid specifications for tensile strength, elongation, size, galvanizing and ductility.
Crapo Galvanized Strand is readily available in all standard grades and sizes. Ask your Jobber, or write direct for technical details!
INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA



THIS MOTOR BOOK IS FILLED WITH VALUABLE DIAGRAMS

Do You Know?

The proper method of making connections for a polarity test on a three-phase delta connected stator? How to lay out armature windings of the split-loop type? The theory of operation and the many types of circuits utilized in capacitor-type split phase motors? Methods of reversing rotation of a-c and d-c motors? How to eliminate brush troubles? Select the best type of varnish?

The answers to these and many other practical problems on motor repair will be found in Jack Beater's new book

"MOTOR REWINDING and TESTING"

All phases of motor rewinding, repair and testing are discussed in this new publication from the practical man's point of view. The author, an experienced motor rewinder himself, has the knack of explaining difficult principles and methods in simple, non-technical language.

Although this book was prepared primarily for the beginner in motor rewinding work, it contains a great deal of practical information that will be found of value even to the "old timers" in the trade. A special feature of the book is the section devoted to the design of tools and equipment useful to the motor rewinding shop.

A glance at these chapter headings demonstrates the scope of this valuable book: Practical motor Tester Panel, Handy Tools for the Motor Shop, Time Saving Coil Winder, Armature Testing, Testing Stators, Classification of Motors, Split Loop Windings, Loop Windings, Fan Motors, Automotive Armatures, Rewinding Small Polyphase Motors, Capacitor Motors, Brush Troubles and Their Remedies, Insulating Varnishes for Electrical Work.

SPECIAL OFFER—"Motor Rewinding and Testing" may be obtained with a 3-year subscription to ELECTRICAL SOUTH for $2.50 or a 5-year subscription for $3.50. Take advantage of this special offer while it lasts. Write today to

ELECTRICAL SOUTH

GRANT BUILDING, ATLANTA, GEORGIA

other, this short circuiting device, travels back and forth inside the commutator according to the speed of the rotor.

When the armature is at rest or running at less than about two-thirds speed, the short circuiting device is held away from the commutator bars by the strong coil spring, and the armature winding causes the motor to start and bring the load up to speed.

When sufficient speed is obtained the weights overcome the spring pressure, push the copper segments or strip into place against the inside edge of the commutator bars, and short all the windings. At the same time, the brushes are "kicked" off the commutator as they are no longer required.

The troubles that arise in the functioning of this mechanism are not many or hard to find. Things to look for are stuck or "frozen" centrifugal weights, bent or misplaced push pins, short circuiting device drum rusted to shaft, and short circuiting segments jammed between commutator and drum. Necklaces composed of individual segments can be cleaned by sandpapering, and restrung on a new wire if necessary. Those made from a single wire should be discarded and replaced if dirty, burned or broken. The cost is negligible.

Sparking at the brushes is usually due to improper contact of the short circuiting device, worn or burned commutator bars, brushes too short, or weak brush springs. Open circuits in the armature windings will have to be rewound or replaced.

Capacitor motors are subject to the same bearing troubles as motors of other types. Having less moving parts than the repulsion-induction motor, trouble shooting on the capacitor motor is reduced to checks on four points: the windings, the switch, the contact points and the condenser.

If a capacitor motor will not start, make sure first that the fault is not in the bearings. Next, with the belt off, and connected to the line, try giving the shaft a twist with the hand. If the motor starts and gets up to speed with a little initial help it indicates that the main winding is all right. If the motor can be started in either direction it proves that the starting winding is not functioning.

Next remove wires from condenser and test the condenser with 110 volt test points with a 50 watt lamp in series. If the lamp does not light through the condenser, the condenser is dry and lacking in capacity or is open circuited. If the lamp does light through the condenser, the condenser may be short circuited. Test the condenser on a condenser tester, or try a new one on the motor.

While the condenser is off the motor locate the ends of both the main and the starting windings, and test each for grounds, opens, and a short between the two. Next examine the silver contact points on the switch inside the motor frame. File lightly if black or burned. Examine weights on rotor shaft to see if they work free. Rust is often found on the shaft under the hard rubber bushing that opens and closes the points. This should be sanded off and lightly oiled. When assembling, make sure that points are firmly together when rotor is at rest, and that they will snap apart when centrifugal switch releases the pressure against them. Make sure that both bearings are well oiled on any type of motor before you leave the job.

Success or Failure

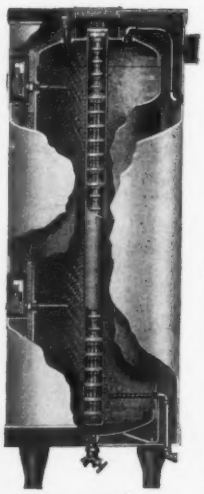
(*Continued from page* 14)

The next letter, "E." "Enthusiasm." Whoever heard of anybody selling anything without enthusiasm? It cannot be done. If a man believes in himself, if he is sold one hundred per cent on himself and humanity, his organization, and the thing he is selling, he will be enthusiastic.

The next letter is "S." Stick-to-it-ability. Have you got it? Have you got the ability to stick to the work you have chosen, make it your life work, conscious of the fact that you have got to study, dig, learn and master that thing from top to bottom? Stick to one thing, because you cannot jump from one thing to another and ever be a success. A rolling stone gathers no moss—that is still true! Choose the thing you want to do, put your all into it, and stay with it to the finish.

The other "S" is good old common "Sense." Apply your God-given common sense, and you won't have to worry.

SEPCO



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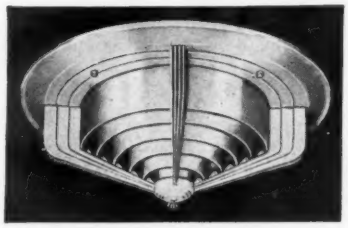

In big cities and small towns all over the country the incomparable sales illumination afforded by Ster-Lites is helping contractors capture store lighting jobs.

Alert merchants are quick to appreciate the selling advantage of intense light for merchandising effectiveness combined with diffused general illumination for eye comfort. They are delighted with the surprisingly low wattage used by Ster-Lites in producing this marvelously effective sales illumination.

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STERLING REFLECTOR CO.
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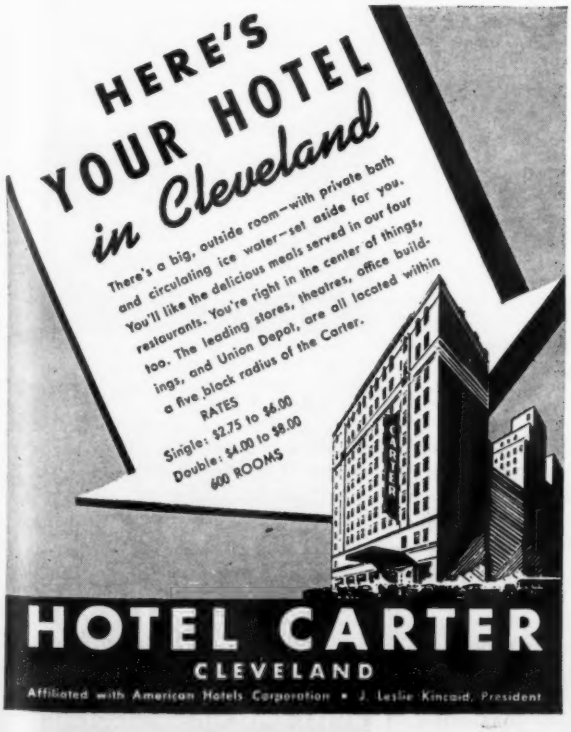
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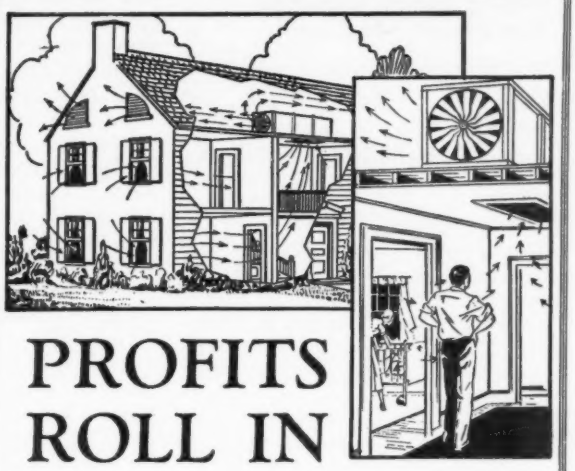

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Like other dealers all over the South, you can make the profits roll in this summer by selling Coolair ventilating and cooling systems. Hot summer weather has turned every homeowner and merchant in your community into a ripe prospect for low-cost, dependable ventilating and cooling equipment. Start making extra profits now by joining up with the hundreds of prosperous Coolair dealers.

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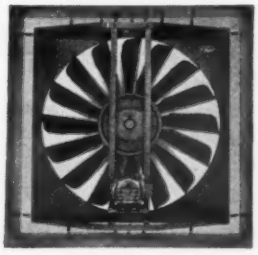

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AMERICAN COOLAIR CORPORATION
Manufacturers . . . . JACKSONVILLE, FLORIDA

Wiring Exhibit Displayed Throughout Mississippi .

(*Continued from page* 16)

signed that it weighs only 232 pounds and can be carried by two men and set up as a window display or on the sales floor to permit close inspection. It contains approximately $80 worth (list price) of wiring devices and equipment and approximately $20 in miscellaneous materials.

Cabell Electric Company, electrical wholesaler of Jackson, was so interested in the possibilities of the display for increasing interest in adequate wiring that it contributed all material and equipment. Similarly, the Martin Electric Company, Jackson electrical contracting firm, contributed all necessary labor to construct the display. These contributions were acknowledged on a small courtesy card attached to the display.

The left side or entrance-control side of the completed display can be energized by connecting the 3-wire, No. 6 entrance cable with a temporary 110/220-volt, 3-wire service connection. All switches and outlets including the range outlet will operate properly. The right side of the display is not connected and outlet boxes are left open for inspection.

In most cases, however, a 25-foot rubber covered extension cord with insulated spring clamps is used to energize the display. The "hot" wire is attached to the two "hot-legs" of the entrance cable and the other wire is clamped to the neutral leg. In this way a quick set-up is possible which is just as effective.

The two-tone chime will strike with two different tones when the front doorbell button is pushed and only one tone when the rear doorbell is pushed.

The radio aerial and ground connection outlet is combined in a triple convenience outlet assembly providing a plug for a floor lamp and all radio connections. As the radio connection plug is a special angle-shaped pronged plug, there is no danger of it being inserted in any receptacle other than that specially designed for it.

The attic fan is a small six-inch window ventilator type fan set over an expanded metal grill. Since the average home owner is seldom able to visualize the installation and operation of an attic fan, this display provides a most instructive exhibit. The delayed time switch controlling the fan always attracts attention, and the inspecting public plays with it until its operation is understood and mastered. This switch operates the fan instantaneously or allows a delayed setting to either turn the fan off, if it is running, or turn it on, if it is not running, at any predetermined time from 5 minutes to 15 hours.

The advantages of shorter circuits and larger size wire are very easily demonstrated with the display.

Committee Reports On Terminal Boxes . . .

(*Continued from page* 15)

In its study, the committee obtained samples of standard motor terminal boxes from the principal manufacturers, which were referred to a special subcommittee headed by H. W. Watts, NECA representative on the main committee. The recommendations of the committee were based upon a report of Mr. Watts' investigation.

The Committee also considered methods for designating motor terminal boxes so that they could be easily identified with the proper size motor and decided that the following two methods could be used:

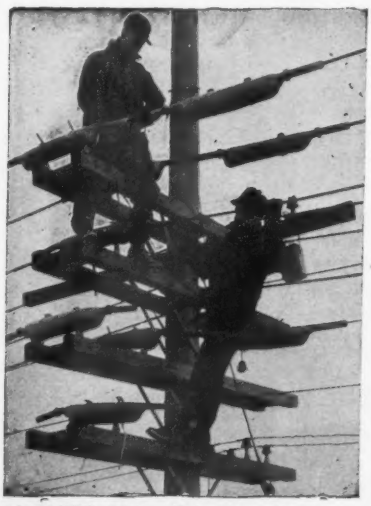
(a) List by frame numbers, recognizing that the average motor would be penalized by being required to have an oversize box in order to accommodate the extreme sizes.

(b) List by rating (horsepower, ampere, or cable size) recognizing that manufacturers would have to make some compromise such as providing additional boxes for the larger sizes of cable (large input motors).

SALESMEN WANTED

Manufacturer of nationally known line of goods sold to electrical, mill supply and industrial trades, needs salesmen with successful records as manufacturers' agents to cover all or part of the following territory: Texas, Louisiana, Arkansas, Mississippi, Kentucky, Tennessee and Oklahoma on commission basis. Must have following among jobbers and be willing to do substantial amount of missionary work. Line has been established for over quarter of a century and trade name is well known to everyone in the industry. A real opportunity for producers. State headquarters city, name all present connections and give references if you want application considered.

Address Box 60, care ELECTRICAL SOUTH, Grant Bldg., Atlanta, Ga.



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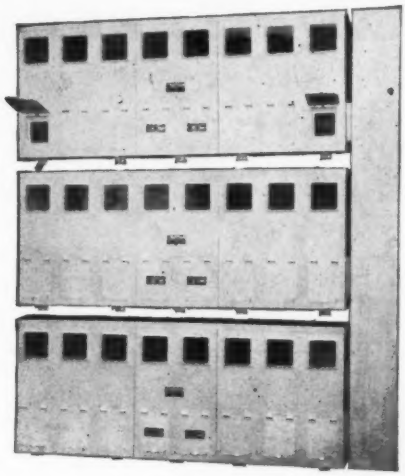

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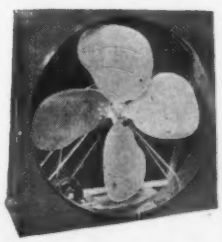

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